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JOURNAL

Dr. Bennett F. Davenport,
751 TREMONT ST.
BOSTON, - - MASS.

OF THE

PHILADELPHIA COLLEGE OF PHARMACY.

EDITED BY

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PREFACE.

In terminating our third volume, we avail ourselves of the opportunity, to make a few observations, naturally arising out of the subject. When, on the death of the late Dr Ellis, the present editor assumed the supervision of the work, at the second number of the present volume, he was wholly unprovided with materials for its successful continuance; the industry and zeal of its promoters and friends, however, has enabled us to present to its patrons, a series of original papers alike honourable to their authors and of permanent utility to science. Most of these, it will be perceived, are of practical importance to the pharmacist; but as the plan of the Journal embraces a wider field than mere pharmacy, the Committee have been anxious to obtain communications of a more general nature; in this it will be seen that we have been partially successful, and we are in hopes, that we shall be enabled to present a succession of papers on improvements in those arts which are based on chemical processes, that will be generally useful. There is another class of communications to which we would invite the attention of those who feel an interest in the work—the Pharmaceutical Notices; practical observations of this character are admirably calculated to advance the art, and tend to obviate many of the difficulties invariably met with, especially among the younger members of the profession. We earnestly solicit a continuance of them, and would remind our brethren, that it is only by the collection of isolated facts, that the fabric of science is to be erected, and that they should not withhold, what to them may appear trivial and

commonplace details, as these very data may furnish the links that are now wanting in the chain of knowledge.

As the *Journal of Pharmacy* is the only publication of the kind in the United States, and is devoted exclusively to the furtherance of the pharmaceutic art, we trust that it will continue to receive such support as will enable the Committee to increase its usefulness. This, however, can only be accomplished by an extended patronage, and we would suggest to all those who feel an interest in its success, that it is by their exertions alone it can attain that rank to which it is entitled. Hitherto, most of the Original Communications have emanated from our Philadelphia brethren, but we hope that our friends at a distance will step forward and contribute their share to its further support.

We would also call the attention of our subscribers to the fact, that on a promptness in transmitting their annual payments, the existence of the *Journal* depends; we are sorry to say that it is only by unceasing exertions on the part of the Committee, that they are enabled to fulfil their engagements. Let it not be said that the Pharmacutists of this country felt too great an apathy, and so little zeal in their profession, as to permit the only journal devoted to the objects of their pursuits, to languish and die.

In conclusion, we would state, that some alterations in the arrangement of the articles, &c. will be made in the next volume, and from the support which has been promised, the Committee are in hopes that no delay will take place in the publication of the respective numbers; much however depends, as we have before said, on the exertions of our distant friends.

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JOURNAL

OF THE

PHILADELPHIA COLLEGE OF PHARMACY.

APRIL 1831.

Original Communications.

ARTICLE I.—*Liriodendrine, or the Bitter Principle of the Liriodendron Tulipifera; Tulip Tree or American Poplar.* By John P. Emmet, Professor of Chemistry and Materia Medica in the University of Virginia.

[Read before the College, February 1831.]

AS this substance appears to have every claim to be considered a new and very well characterised proximate principle, and inasmuch as it exhibits no alkaline or acid properties, it will, in conformity with the prevailing practice, be described under the name of *Liriodendrine*. The decoction made from the bark of the tulip tree yields an abundant precipitate upon the addition of aqua ammoniæ, the caustic fixed alkalies, or their carbonates, and at the same time the solution loses its intense bitterness. This circumstance induced me to examine, more particularly, the substance thrown down, and although the result has shown the absence of an organic alkali, it led me to the discovery of a substance, interesting not only for its medical properties, but for its chemical habi-

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tudes. The Liriodendrine is indeed a very peculiar body, and it is not at all singular that hitherto it has passed for a resin. When not crystallized, but simply fused, the general resemblance is very great; but in its chemical properties it differs from every other substance with which I am acquainted.

The bark of the tulip tree, it is well known, has long been in use as a tonic and febrifuge, yet it must be admitted that its administration hitherto has failed to secure to it the reputation of an uniform and active medicine. Without assigning to the Liriodendrine more efficacy than exists in the bark itself, I am of opinion that its properties will readily account for much of this want of uniformity. A temperature of about 270° F. is sufficient to volatilize rapidly this bitter principle, and at the same time partly to decompose it. This circumstance struck me very forcibly before I succeeded in obtaining the Liriodendrine crystallized. An infusion or decoction of the bark has a hot and very bitter taste, leaving an impression upon the tongue similar to that produced by the canella alba, yet, when the solution is freely evaporated to dryness, these properties become so much impaired, that the residuary matter seems to be almost tasteless. Hence, so far from its being possible to form an extract from the Liriodendron Tulipifera by the usual process, it seems impracticable to boil the bark with water in covered vessels without effecting the decomposition of the active principle.

Mode of preparing Liriodendrine.—All the soluble salts, when added in sufficient quantity to saturate the aqueous solution of the bark, seem to occasion the precipitation of this substance; but as it is rendered soluble by the presence of colouring matter, it will be more completely displaced by the addition of some active bases, as the alkalies and earths. The objection to the use of the former is that the pectic acid, which abounds in the fresh bark, forms gelatinous salts, which interfere with the subsequent filtration; and when lime or magnesia is employed, it is difficult to effect a complete decomposition within the bark. The fol-

lowing I found to be a much more convenient process. The bark is to be stripped from the roots, dried, and finely pulverized; it is then to be steeped for several hours in cold alcohol. The fluid, when saturated, is to be removed, and fresh portions added until the bark becomes exhausted. By employing the alcohol hot, and straining forcibly through a strong cloth, this result will be accomplished, after three or four repetitions. The alcoholic solutions are next to be filtered, and transferred to a large retort, or alembic, and heated until at least two-thirds of the fluid have been recovered by distillation. Towards the end of the process, the impure Liriodendrine will separate, and collect at the bottom in large semi-fluid masses; it may be readily obtained by pouring out the contents of the vessel, and allowing the whole to cool. The remaining liquid is then to be gently evaporated in an open vessel, until it assumes the consistency of honey. The temperature should not exceed 200° F. This dark resinous looking mass is to be incorporated with the portion which separates during the distillation, and then triturated with a warm solution of caustic potassa, soda, or aqua ammoniæ. The alkalies remove a large quantity of colouring matter, and the Liriodendrine, being insoluble, separates, and may be brought together by a spatula. This treatment with caustic alkali must continue until the solution passes off colourless. The Liriodendrine in this state has a drab colour (which becomes lighter by exposure to soft water) and a waxy lustre. At a temperature of 30° or 40° it is hard and brittle, but softens in the hand, and bears a close resemblance to putty.

It appears, from an examination made upon a small scale, that the recent bark taken from the root, and dried at a temperature of 70° F., loses, by the repeated action of alcohol (holding 11 per cent of water, according to the centesimal alcohometer of Gay Lussac), as much as 40 per cent. Of this amount the Liriodendrine composes more than 7 per cent; but it was not easy to determine the exact proportion, inasmuch as the alkaline solutions always carry off a portion.

I incline to believe that, on a large scale, it will be found more convenient to boil the impure tincture of the bark with calcined magnesia until the fluid assumes an olive green colour. It may then be concentrated by distillation, until it appears turbid, and in this state, when removed and gradually mixed with cold water (the fluids being agitated at each addition), the Liriodendrine readily precipitates as a white powder, or, by repose, will separate in the crystalline state.

The peculiarities of this substance prevent us from obtaining it crystallized from *hot* concentrated alcoholic solutions. In this particular Liriodendrine differs essentially from salicine and the bitter vegetable principles hitherto described. If such a solution be examined with an eye glass, it will appear saturated with exceedingly minute globules of an olive green colour, but there will be no indications of crystallization even after spontaneous evaporation; the Liriodendrine merely separates as a transparent varnish; water seems necessary for its crystallization, and in this state there is great reason for believing that it is a *hydrate*. The water, however, should be added gradually until the colour of the solution becomes pearl white, and the temperature should be as low as 40° or 50°. The crystals obtained in this manner and by spontaneous evaporation are very pure; but always present different forms, among which may be observed triangular and rhomboidal plates, interspersed with plumose or stellated prisms; some of them are perfectly limpid, while others have the micaceous appearance of boracic acid. As the Liriodendrine may be washed with cold alkaline and acid solutions, without any loss, it is evident that it admits of complete purification.

The difference between *Liriodendrine* in its crystalline and fused states is very striking; crystallized, it freely dissolves in alcohol, forming a *colourless solution*, which readily furnishes crystals by spontaneous evaporation, and without the necessity of adding water; when gently heated, the crystals fuse, slightly effervesce (owing to the escape of

water), and then become olive coloured, without any appearance of crystallization upon cooling. In the fused state, on the other hand, the alcoholic solution is always olive green, and scarcely gives any indication of a regularly formed deposition, unless the alcohol employed is dilute.

The alcoholic solutions of both varieties possess an intensely bitter taste, but always leave the impression of heat upon the tongue. Perhaps the combination of these properties may add to its value as an article of the *materia medica*; they seem at all events to be characteristic of the Liriodendrine in its purest state. The proper solvent for this substance is sulphuric ether.

In addition to the foregoing, it will here be proper to add the following remarks. Crystallized Liriodendrine is solid, brittle; and inodorous at 40°, fusible at 180°, and volatile at 270° F. When carefully heated in a glass tube closed at one end, it gives off a white vapour, which condenses again, without signs of crystallization, and is the Liriodendrine unaltered. But it is impossible, even with the utmost care, to effect the complete sublimation of this substance. About one half of it remains and appears to consist of a solid brittle resin. I could discover no trace of benzoic acid or of ammonia in the sublimed portion, even when the temperature was raised so as to effect the decomposition of the Liriodendrine. The vapour is aromatic and indicative of the plant.

Weak acid or alkaline solutions have no other effect upon this substance than to occasion its complete precipitation from dilute alcohol; but the case is quite different when the Liriodendrine is exposed to these bodies in a concentrated state. Thus,

Caustic potassa or soda, dissolved in a small quantity of water and boiled with the crystals, appears to convert them into oxalic acid. In this respect Liriodendrine differs materially from the resins.

Cold concentrated sulphuric acid dissolves, and at the same time decomposes it with the greatest facility, forming

a yellow or orange red solution, according to the quantity employed. Upon diluting the acid, a white matter separates.

Cold concentrated nitric acid dissolves the crystals rapidly, without in the least discolouring them, and the solution is effected without the escape of any gaseous matter. The acid may be even gently evaporated, and the Liriodendrine recovered without any material alteration. Boiling the acid produces complete decomposition, and a yellow resinous matter remains.

Cold concentrated muriatic acid has little or no action; but, when heated, the Liriodendrine effervesces and assumes a deep emerald green colour. A small portion, however, seems to escape decomposition, and may be precipitated from the acid by the addition of water.

Iodine, in substance, almost immediately imparts to the crystals a bright chrome yellow colour, and, in the end, forms an insoluble matter, which retains a grass green colour after all the excess of iodine has been removed by a gentle heat. This is, no doubt, a definite compound; for it assumes its original yellow tint when water or alcohol is added. In this state, also, the Liriodendrine is scarcely soluble in alcohol. Although the colour produced by iodine is not so intense as that resulting from the action of the same substance upon boiled starch, it appears to be no less characteristic of small quantities; for, notwithstanding the almost complete insolubility of the Liriodendrine in cold water, if a particle of the iodine be placed upon the surface of this very weak solution, it very soon becomes surrounded by an opaque yellow film. This compound is immediately decomposed by nitric acid, which liberates the iodine and dissolves the Liriodendrine.

Chlorine and bromine produced no marked effects upon this bitter principle. Both in its fused and crystallized state it is heavier than water, at the ordinary temperature; but as the fluid approaches the boiling point, it floats upon the surface.

When the crystals are thrown upon a burning coal, they

melt and volatilize in an instant without undergoing combustion ; but when touched by a fragment of warm spongy platinum, they become absorbed and then may be kindled by a candle ; they burn with a brilliant white flame, giving much soot, like resins and oils.

When Liriodendrine is fused, it bears a close resemblance to a soft resin; in this state, also, it seems to be incapable of crystallizing; but its volatility, very low point of fusion, incapacity to unite without decomposition with the alkalies, extremely bitter taste, and the definite combination which it seems capable of forming with water, all exhibit a very marked difference between it and any resin with which we are acquainted. I attempted, in vain, to form a crystalline hydrate of common resin, (it always separated in transparent globules), and, as we have no satisfactory evidence that resins ever occur crystallized, this condition of the Liriodendrine may be regarded as alone sufficiently distinctive. It is true that M. Pelletier states his having seen the balsam of copaiba in a crystalline form ; but the article, besides being of a compound nature, was at least thirty years old at the time of observation.

To conclude, I may observe that the properties of *Liriodendrine* seem to place it with camphor, as a connecting link between the resins and volatile oils.

ART. II.—*On the Liriodendron Tulipifera, American Poplar or Tulip Tree.* By Benjamin Ellis, M.D.

Our readers will perceive by the preceding essay that this tree has acquired an increased interest, from the discovery of a new organic principle in the bark of its root, by professor Emmet of the University of Virginia. This circumstance has induced us to furnish a brief sketch of its natural histo-

ry, accompanied with a plate, with the view of rendering more complete the very interesting article on "*Liriodendrine*."

The tulip tree may indeed be called the pride of the American forest; noble in all its dimensions, attaining an altitude of from seventy-five to one hundred feet, and measuring from two to five feet in diameter. It is surpassed by few or none in the richness of its foliage, the beauty of its flowers, the uniform straightness of its trunk, and the regular disposition of its branches; its wood is abundantly employed in the arts and in rural and domestic economy, and its bark has been highly extolled as a remedy in fever and some other diseases. It is known by different names in different parts of the country; such as, white wood, canoe wood, American poplar, American tulip tree, tulip bearing poplar, &c. The term tulip tree is obviously the most proper, from the palpable resemblance of its flowers to the garden tulip, and it is to be wished, for the sake of avoiding confusion, that this name were universal; but American poplar is by far the most common throughout the United States. According to Michaux, the northern limit of this tree may be placed at the southern extremity of Lake Champlain, in lat. 45°, and it seldom extends further east than the Connecticut river, in long. 72°. From these points it is widely diffused to the south and west, attaining its greatest degree of development and perfection in the rich bottom lands of the western states; it is generally found mingled with other trees, such as the hickory, black walnut, butternut, wild cherry tree, &c., but sometimes it was observed by Michaux to constitute pretty large tracts of forest in Kentucky, where he found this tree larger than in any other part of the United States.

Its vegetation is repressed in the colder climates of the northern states; and in the eastern parts of the Carolinas and Georgia it does not flourish well, owing to the nature of the soil, which is either too dry and sterile, as in the *pine barrens*, or too wet, as in the *swamps*. "The genus

Liriodendron, to which Linnæus has assigned four species of trees, is characterised by a *double calyx*; the outer of two, the inner of three leaves; petals six; seeds imbricated into a cone. The species *tulipifera*, the only one in America, is remarkably distinguished by its *lobed and truncated leaves*; together with several other of our finest flowering trees and shrubs, the *Liriodendron* is found in the class *polyandria*, and order *polygynia*, and the natural orders *coadunatæ* of Linnæus, and *magnoliæ* of Jussieu." In the structure of its buds and the development of its leaves it is no less peculiar than in their outline; each leaf-bud is composed of scales closely applied upon each other, and it forms an oval sack, in which is enclosed the young leaf, to be unfolded as it acquires sufficient maturity to bear exposure to the light and air; several sacks are thus embraced, one within the other, which swell, burst, and evolve the leaves in succession, so that from one original or principal sack, five or six leaves will unfold on young and vigorous trees.

These sacks or sheaths swell to a large size before bursting, and the remains of them, being converted into *stipule*, continue attached to the leaves until they are half-grown. In the warm and damp weather of our spring these leaves grow very rapidly, and acquire a breadth of six or eight inches. They are supported on long petioles, alternate, somewhat fleshy, very smooth, and of a bright green colour; in form, as before observed, they are altogether peculiar, and are a distinguishing feature of the tree. They are divided into three lobes, of which the middle one is horizontally notched at its summit, which gives it the appearance of being four-lobed; and the truncated extremity, which gives to the leaf its singularity, bears considerable resemblance to the tail of a fish. The two lower lobes are rounded at the base, and in the larger leaves they are furnished with a tooth or additional lobe on the outside.

There is one variety of this tree whose leaves are not pointed, but very obtuse.

The flowers are bell shaped, large, brilliant, and on de-

tached trees very numerous. They are variegated with different colours, among which the shades of yellow predominate, and they are in common seasons fully expanded about the middle of May. Their odour, though faint, is agreeable, and they produce a singularly beautiful effect when surrounded with the luxuriant foliage of this magnificent tree.

"The outer calyx has two triangular leaves, which fall off as the flower expands; the inner calyx consists of three large, oval, concave, veined leaves of a green colour, spreading at first, but afterwards reflexed. Petals six, sometimes more, obtuse, concave, veined of a pale yellowish green, marked with an irregular indented crescent, of a bright orange on both sides, towards the base.

"Stamens numerous, with long linear anthers opening outwardly, and short filaments; pistil, a large conical acute body, its upper half covered with minute, blackish, recurved stigmas, its lower furrowed, being a mass of coalescing styles and germs."

The fruit is a cone of two or three inches in length, formed of a great number of very thin narrow scales, attached to a common axis, and pointed at the summit. Each of these, when well filled, consists of sixty or seventy seeds, of which never more than one third, and some seasons not more than seven or eight of the whole number are productive. It is stated that all of these seeds prove abortive for the first ten years, and even after the trees have attained that age, the seeds from the summit branches of the large ones possess the power of germinating in the greatest perfection.

Until the diameter of the tulip tree exceeds seven or eight inches, the bark is smooth, even, and of a brownish colour; afterwards it cracks, and the depth of these fissures, and the thickness of the bark, are in proportion to the age and size of the tree. The branches, which are not very numerous, when of one summer's growth, are pithy and of a shining blue colour; those of two seasons old are covered with a smooth brown bark, and, when broken, emit a strong but rather agreeable odour.

The bark of the trunk, branches and root, is brought to our druggists by those who derive a slender revenue from collecting our indigenous articles of the *materia medica*. That from the tree and limbs is in pieces of three or four inches long, deprived of its epidermis, of a yellowish white colour, very light, and easily broken. The taste is pungent and aromatic, somewhat camphoraceous, bitter and very slightly astringent. That from the root comes in irregular pieces, three or four lines in thickness, rather browner than the preceding, and partially stripped of its epidermis.

When drying it gives off a heavy and not very agreeable odour; the taste is perhaps more heating and aromatic than in that taken from the tree, and it is rapidly diffused over the tongue and fauces, leaving a tolerably permanent impression of warmth in the mouth.

The tincture of the bark of the root is of an orange yellow with a shade of red, not very unlike the colour of Teneriffe wine; the taste in a high degree warm, bitter, aromatic and penetrating. The odour of the alcohol conceals that of the bark. The colour of the aqueous infusion resembles that of the spirituous, but is rather paler; the smell is more perceptible, but the taste is more feeble, and not very agreeable.

The bark of the *Liriodendron* has long enjoyed some reputation as a remedy in the cure of intermittent and other forms of fever, as well as in rheumatism, dyspepsia, &c. It is probably much more frequently used in domestic than in regular practice. By Dr Young, formerly of Philadelphia, it was strongly recommended in a letter addressed to Gov. Clayton of Delaware, which was published in the *American Museum* for December 1792.

The latter gentleman in reply, remarked that he considered it more bitter and aromatic, though less astringent, than the Peruvian bark, and found it, combined with the barks of the dog wood and white oak, beneficial in every case to which the cinchona was applicable. The specimens I have

tasted do not certainly manifest this striking bitterness, and the superiority which he ascribes to it in this respect over the bark of Peru, can only be accounted for by the fact, that it is only a few years since the physicians of this country were acquainted with more than one kind of cinchona, and that was the Carthagena bark, an article now justly esteemed nearly worthless.

Dr Young ascribes to it great efficacy as a febrifuge; as a remedy in consumption, dyspepsia, hysteria (combined with laudanum), cholera infantum, and finally as a vermifuge. For the latter purpose, we are informed, the infusion is given in large quantities to horses in some parts of the country. Sometimes it excites vomiting, and cannot be borne without the addition of laudanum; at others it operates as a cathartic. It should never be given in acute diseases, before the excitement has been subdued by proper depletion. As the active properties of this bark evidently depend on a volatile principle, it loses its virtues by time, and should therefore be kept secluded from the air, and collected annually for medicinal purposes. The bark of the roots is believed to be more energetic than that of the tree or branches, and the proper season for gathering it is in the winter, before the sap begins to circulate. Michaux states, that in Paris a spirituous liquor is made from the fresh bark of the poplar roots, with the addition of a sufficient quantity of sugar to render it agreeable.

The dried or recent leaves steeped in boiling water are considered by some as a specific in the cure of inflammation of the jaw and face, and I have been assured that the relief procured by this kind of fomentation was very prompt and complete.

The bark is introduced into the materia medica of the United States Pharmacopœia, but it has no official preparations.

It may be given in the form of tincture, infusion or powder. The latter is considered the most efficacious, and its superiority over the aqueous preparations has been

accounted for by professor Emmet. The dose in substance may be from ʒj to ʒij.

The colour and quality of the wood of the tulip tree are said to be greatly influenced by the nature of the soil and the kind of exposure. From the appearance of the wood, it is distinguished by the names of white and yellow poplar by the mechanics; and although there are some general features by which a practised eye can judge with tolerable accuracy between the two while standing, yet the difference can only be ascertained with certainty by cutting into the trees.

The wood of the white poplar is of a coarser grain, harder, and the yellow heart bears a much smaller proportion to the sap than in the yellow variety. It is consequently much less valuable for the purposes of the mechanic, and is subject to decay more rapidly. This tree has been transplanted to Europe, and is carefully cultivated as a rare ornament of the park and pleasure grounds. It flourished well both in England and on the continent, and is highly valued for the attractions it possesses, in the beauty of its flowers and foliage, in its magnitude and utility.

ART. III.—*On Ichthyocolla.* By Daniel B. Smith.

The swimming bladder, with which most fishes are furnished, is an important and valuable material in the arts, and deserving of more attention than it has yet received from the fishermen of our coasts. This bladder or air bag is placed in the anterior part of the abdominal cavity, and adheres to the spine. Its use in the vital economy of fishes is not fully understood. By some it is supposed that the fish has the power of contracting or expanding it so as to enable

it to sink or rise in the water. By others it is considered as a reservoir of air, secreted by the blood into this organ, to be thrown out again into the system for the support of life. This opinion has received some colour from the experiments of Biot upon the air contained in the bladders of fishes caught at various depths in the ocean. It was found to consist of oxygen and nitrogen in various proportions. In the common mullet (*mugil cephalus*) the quantity of oxygen was insensible; while in a fish called the piper (*trigla lyra*) it constituted eighty-seven per cent of the mixture. The proportion of oxygen was found to increase with the depth at which the fish was caught.

The air bladder in most fishes communicates with the stomach or with the œsophagus by means of a duct, which, in the sturgeon, is nearly an inch in diameter. In the cod, the haddock and some other fishes, no communication has been discovered between the two, and in these cases the surface of the air bladder is attached to a red coloured organ consisting of a great number of folded or doubled membranes. In those fishes which possess the duct spoken of, this red substance is either very small or entirely wanting. The shape of the air bag varies according to the species. "In the herring and some other fishes it is oblong and pointed at both ends. In the salmon it is obtuse at both ends. In the turbot it is obtuse in the lower end, and bifid at its superior extremity. In the carp it is divided transversely, and in the silurus longitudinally into two lobes."

The bladder is entirely wanting in the cartilaginous fishes with fixed bronchiæ, which include the lamprey, the shark, the ray fish and the saw fish, and in some osseous fishes, as the flounder and the mackerel.

This organ consists almost entirely of pure gelatine, containing only about three per cent of earthy salts. The greater part of the isinglass found in commerce is furnished by the Russians, and the best is prepared from the air bladders of sturgeons caught in the Caspian sea and its tributary streams. There are four species of this genus found in the

Caspian sea, viz. the common sturgeon, *Acipenser sturio*; the sterlet, *A. ruthenus*; the starred sturgeon, *A. stellatus*; and the beluga of the Russians, *A. huso*. From three hundred thousand to four hundred thousand of the first named species are caught in a year. The second is prized as the greatest delicacy for the table; but the best isinglass is made from the *A. stellatus*, of which a million and a half, valued at seven hundred thousand dollars, are sometimes taken in a year. The beluga attains an enormous size; one of them being sometimes a sufficient load for three horses. One hundred thousand of this species have been caught in a year.

In preparing the isinglass, the sounds are taken from the fish while fresh and sweet, cut open, washed, and well cleaned from the surrounding membranes. They are then exposed to stiffen a little in the air, and formed into rolls about the thickness of a finger. The extremities of the roll are turned inward and pinned together with a small wooden peg, and the proper shape given to the *staple* with the finger. It is then laid on boards or hung up in the air to dry. The book isinglass is made from the thicker membranes, which are not easily worked into the form of staples. The staple isinglass was formerly accounted the best, but much inferior isinglass of that kind has latterly been brought to this country, and the fine book sort is now in much esteem. The finest membranes exhibit a beautiful opalescence when held in certain positions. The ordinary book and staple isinglass are said to be made of the intestines and peritoneum of the fish. A still inferior kind, called cake isinglass, is made by melting the fragments and scraps of the other sorts in water, and drying them in a pan. We have sometimes met with this sort rolled into small globular masses.

The sounds of the cod (*gadus morhua*) and the ling (*gadus molva*) also furnish isinglass of a good quality; although they are principally used for salting, as an article of food. As it is difficult to separate them from the spine, the fishermen throw that part of the back-bone which is cut off

previous to salting the fish, into heaps, which are left for a few days, after which the sounds are readily separated. The Iceland fishermen beat the bones on a block with a thick stick, in order to separate the sound entire. If the sounds have been cured by salting, they must be steeped in fresh water, until the salt is washed out, before they can be used for making isinglass. In order to use them for isinglass the membrane must be well scraped on both sides, steeped for a few minutes in lime water to absorb the oil, then washed in clean water and dried. The isinglass thus made is little inferior to the Russian; although in using it for clarifying liquors, it falls more speedily and compactly to the bottom.

Tooke, in his survey of the Russian empire, says, that the air bladder of the *shad* is much used for making an isinglass of an inferior quality.

The *didion atinga*, a species of the globe fish or sea hedge-hog—a native of the tropical seas, furnishes an isinglass equal in quality to that obtained from the *acipenser huso*.

The air bag of the *silurus glanis* also furnishes an excellent isinglass. This *silurus* is a large fish, which sometimes attains the length of fifteen feet, and inhabits the larger rivers of the old continent. It belongs to the same division, and was formerly included in the same genus with the catfishes (*pimilodes*) of the Ohio and Atlantic rivers.

An isinglass of a good quality is likewise said to be made from the skins of some of the species of the perch (*perea*.)

In addition to the book and staple isinglass imported from Russia, there are several other varieties of this drug found in our market.

The air bladder of a large fish, which is unknown to me, is brought from Brazil, from which country it is said to be an article of extensive exportation. It is simply dried without altering the natural shape of the bag, which is oblong, tapering and pointed at one end and bifid at the other, from which also proceeds the pneumatic duct that connects the

bladder with the stomach or *œsophagus*. These bags are from five to eight inches in length, and weigh from two to four ounces and upwards. The quality of the isinglass is said to be very good, and it is much used in fining liquors.

An isinglass of inferior price and quality is prepared on the coast of New England, which has been much used in this country. It is in thin ribbands, several feet long, and from an inch and a half to two inches in width, and is evidently prepared from the intestines of a fish. It is less soluble than the Russian isinglass, and the glue which it forms is comparatively weak and dark coloured.

Within the last year or two, small quantities of isinglass of a very good quality have been furnished by the New York druggists. This sort is merely the dried sounds of the weak fish, and perhaps some other species which are caught in the harbour of New York. The air bladder is separated and dried in its natural shape, or merely cut open. It is probable from their appearance when dried that the bladders are obtained from several fishes, for they differ in texture and size, weighing from a drachm up to an ounce. This isinglass is very soluble, makes a strong clear jelly, and is furnished at a very reasonable price, much below that at which the imported drug can be sold.

It is much to be wished that more attention were paid to the development of the great resources of the United States in reference to this and other productions, which are now wasted. There are few objects more worthy of a premium at our great exhibitions of national industry, than the preparation of a certain quantity of good isinglass from the fishes of our rivers and seas. The cod, the sturgeon, the cat-fish, and even the shad and the herring which visit us in such innumerable shoals, could thus be made to furnish a new source of wealth, from what is now considered as worthless offals.

The works which have been chiefly consulted in compiling the above account, are the *Edinburgh Encyclopedia*,
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Art. Ichthyocola; Malte Brun's Geography, Art. Caspian Sea; and a paper by Humphrey Jackson, Esq. in the 63d vol. of the Philosophical Transactions.

ART. IV.—*Dissertation upon the subject of Peruvian Bark.*
By George B. Wood, M.D.

As no generally accessible work exists in this country, containing a satisfactory account of Peruvian Bark in its relations to natural history, commerce, and pharmacy, a condensed treatise on the subject may be acceptable if not useful to the readers of this Journal. The following remarks do not profess to embrace all that can be said on a theme so fruitful. The object is to give a general view of the present state of knowledge in reference to this highly important medicine, with such particulars of its history as may seem most deserving of notice; and it is intended that nothing shall be overlooked which is likely to be of peculiar interest to the pharmacist. A consideration of its medical powers and application to the treatment of disease, belongs to a different profession. The remarks, which it is proposed to make, may be included under the three heads of its botanical, commercial, and pharmaceutic history: in the present number, those only will be given which belong to the botanical department.

Though the use of Peruvian Bark was introduced into Europe so early as 1640, it was not until the year 1737 that the plant which produced it was known to naturalists. In that year, La Condamine, one of the French Academists who were sent into South America to make observations relative to the figure of the earth, on his journey to Lima, through the province of Loxa, had an opportunity of examining the

tree, of which, upon his return, he published a description in the Memoirs of the Academy. Soon afterwards Linnæus gave it the name of *Cinchona officinalis*, in honour of the countess of Chinchon, who is said to have first taken it to Europe; but in his description of the plant he is stated by Humboldt to have united the species discovered by La Condamine with the *C. pubescens*, a specimen of which had been sent him from Santa Fe de Bogota. For a long time botanists were ignorant that more than one species of this genus existed, and the *C. officinalis* continued till a comparatively recent date to be recognised by the Pharmacopœias as the only source of the Peruvian Bark of commerce. A plant was at length discovered in Jamaica, having the generic characters of the Cinchona as then established, and received the title of *C. Caribæa*. Analogous species were afterwards met with in various parts of the West Indies; Forster found one in the island of Tongataboo in the South Pacific; Roxburgh another on the Coromandel Coast of Hindostan; Nec a third in the Philippines; many new species were discovered in various parts of New Granada and Peru by Mutis, Zea, Ruiz and Pavon, Humboldt and Bonpland, and Tafalla; several Brazilian plants appeared to certain botanists worthy of ranking in the same genus; and even the southern portion of our own country, and the distant isles of Bourbon and Mauritius were made to burthen with their productions the already greatly overloaded catalogue. Not less than forty-six different plants have, by various authors, been brought under the genus Cinchona; and the number would be greatly augmented were we to admit as distinct species all the varieties for which this rank is claimed by one or another botanist. But in thus throwing together the productions of so many and such distant climates, botanists compelled an association which nature never intended, which many authors, indeed, have never acquiesced in, and which is now dissolved by universal consent. Between some of the plants thus associated, there exists scarcely any resemblance in appearance, or habitudes, or medicinal properties; and a compara-

tively small number have been found to afford products, possessing the chemical characters which distinguish those of the genuine *Cinchona*. According to De Candolle there exists sufficient ground for distributing these various species into eight genera, viz. *Cinchona*, *Buena*, *Rimijia*, *Exostemma*, *Pinckneya*, *Hymenodyction*, *Luculia*, and *Danais*. They all belong to the class and order Pentandria Monogynia, natural order Rubiaceæ of Jussieu ; and may be considered as constituting a distinct tribe of this family. The distinguishing botanical characters of these various genera are given in a paper by De Candolle, a translation of which was published in the last two numbers of this Journal. The *Cinchona* is confined exclusively to Colombia and Peru. The *Buena* includes two Peruvian and one Brazilian species, the former of which, before the change of name, were designated as the *Cinchona acuminata*, and *Cinchona obtusifolia*. The genus *Remijia* was established by De Candolle, and embraces three shrubs of Brazil, which were ascribed by August. de St Hilaire to the *Cinchona*, and the bark of which is used as a febrifuge by the natives of the country. To the *Exostemma* belong the West India species, of which there are not less than nine, formerly known as the *Cinchona Caribæa*, *C. floribunda*, &c. To the same genus belong the former *Cinchona Philippica* of the Philippine islands, four species indigenous to Peru, and two discovered by M. de St Hilaire in Brazil. The *Pinckneya* consists of a single species inhabiting Georgia and South Carolina, discovered by Michaux the elder, and described in some botanical works by the name of *Cinchona Caroliniana*. The *Hymenodyction* is an East India genus, including the *Cinchona excelsa* of Roxburgh, found on the Coromandel Coast. The *Luculia* is also of the East Indies. The *Danais* inhabits Bourbon and the Isle of France. Of these various genera, the *Cinchona*, the *Buena* or *Cosmibuena* of Ruiz and Pavon, and the *Exostemma* have been most generally confounded. The last, however, is decidedly distinguished by the projection of the stamina beyond the corolla, a character expressed in the name of the genus.

The two former are still frequently combined by scientific writers. The Buena was originally suggested as a distinct genus by Ruiz and Pavon, has been recognised by De Candolle and some other writers, and appears to be sufficiently characterized. A botanical description of it may be seen by consulting the paper of De Candolle before alluded to. The genera, which have at various times been confounded with the true Cinchona, have been thus briefly noticed, because the barks of some of them have been substituted for the genuine febrifuge of Peru, and in the description of the false barks of commerce, there will be occasion to allude to them. I shall now proceed to consider the proper Cinchona.

It has been stated that La Condamine was the first botanist who had an opportunity of examining the cinchona tree. The species observed by him was in the vicinity of Loxa, and has subsequently received from Humboldt the name of *Condaminea*. In the year 1739, two years after the visit of La Condamine, Joseph de Jussieu was in the same neighbourhood, where he gathered numerous specimens which are still preserved in Jussieu's collection at Paris, and among which Humboldt recognised his own *C. Condaminea*, and the *C. pubescens* of Vahl. From the period at which Linnaeus drew up the description of his *C. officinalis* from a specimen of the latter species, the knowledge of botanists with regard to the Cinchona remained stationary till the year 1772, when Mutis, a Spanish physician, who had long resided in Santa Fe de Bogota, discovered cinchona trees upon the mountains in the neighbourhood of that city. Not less than four species were described by this author as inhabiting the vice royalty of New Granada. A few years afterwards other species of the same genus were discovered in the mountainous provinces to the north west of Lima, whither a botanical expedition had been sent by the Spanish government under the direction of Ruiz and Pavon, the celebrated authors of the Flora Peruviana. By these gentlemen, associated with Tafalla, not less than thirteen species were described, several of which, however, have been subsequently found to be

identical with one another, or mere varieties of some species before described. The country of the *Cinchona* was afterwards visited by Humboldt and Bonpland, whose personal researches resulted in the discovery of at least two new species, and by whom much light has been thrown upon the intricate subject of the botanical and commercial history of Peruvian Bark. Besides the botanists above mentioned, several others have at different times directed much attention to the natural history of this genus of plants, and by the examination of dried specimens, or by the critical acumen which they have carried into their investigations of the works of other botanists, have assisted in the determination of the several species. Among these may be mentioned Zea, the pupil and friend of Mutis; Lambert, vice president of the Linnean Society of London; Vahl, a distinguished Danish botanist; Bergen, author of a recent German work on the subject of Peruvian Bark; and the celebrated De Candolle, whose paper on cinchona in the *Bibliothèque Universelle* has attracted considerable attention. Laubert, a French physician of eminence, and Guibourt, a distinguished pharmaceutist of Paris, may be mentioned among those who have contributed to illustrate this difficult subject, rather, however, in the department of pharmacy than of botany.

It has been stated that the genuine cinchona trees are confined exclusively to the continent of South America. Within these limits, however, they are very widely diffused, extending from La Paz in the former vice royalty of Buenos Ayres, to the mountainous regions of Santa Martha on the northern coast. Those which yield the bark of commerce grow at various elevations on the Andes, seldom less than four thousand feet above the level of the sea, and require a temperature considerably lower than that which usually prevails in tropical countries.

There appears to have been much difficulty in arranging the plants belonging to this genus into their appropriate species; and botanists have not only differed among themselves on this point, but have, in some instances, exhibited a de-

gree of excitement unbecoming the dignity of science. Ruiz and Pavon, in the *Flora Peruviana*, describe thirteen new species, while Mutis reduced all those observed by him to seven, and professor Zea has attempted to prove that almost all the efficacious species of Ruiz and Pavon are reducible to the four described by Mutis in the year 1793, in the *Literary News of Santa Fe de Bogota*. It appears from the best testimony that the number of the species has been unnecessarily augmented by certain botanists, mere fugitive differences depending on peculiarities of situation or growth, having been exaggerated into permanent characteristics. One source of the difficulty of a proper discrimination is stated by Humboldt to be the varying shape of the leaves of the same species, according to the degree of elevation upon the mountainous declivities, to the severity or mildness of the climate, the greater or less humidity of the soil, and to various circumstances in the growth of individual plants. Even the same tree often produces foliage of a diversified character; and a person not aware of this fact, might be led to imagine that he had discovered different species from an examination of the leaves which have grown upon one and the same branch. The fructification partakes to a certain extent of the same varying character with the foliage; and the difficulty is thus still further augmented.

Lambert, in his "*Illustrations of the Genus Cinchona*," after admitting with Humboldt the identity of several varieties which had received specific names from other botanists, describes nineteen species exclusive of the two Peruvian *Buena*. De Candolle enumerates only sixteen well ascertained species, but admits the probable existence of several others not yet published.

In the present state of our knowledge, it is impossible to decide from which species of *Cinchona* the several varieties of bark are respectively derived. The former references of the yellow bark to the *C. cordifolia*, of the pale to the *C. lancifolia*, and of the red to the *C. oblongifolia*, have been very properly abandoned in the last edition of the *United States*

Pharmacopœia, though still retained in those of the London and Edinburgh Colleges. It will be shown hereafter, that the valuable barks, which are now known in the market by these titles, are at least in two of these instances, not the product of the species to which they have been ascribed. It is stated by Humboldt, that the property of curing agues belongs to the barks of all the Cinchonæ with hairy and woolly blossoms, and to these alone. In Lambert's catalogue, this division includes seventeen species. The most prominent of these will be particularly noticed in this paper, the others merely mentioned.

1. *C. lancifolia*.—Not a little difference of opinion has existed on the subject of this species of Cinchona. The name was applied by Mutis to a tree, first noticed by himself, which flourishes in the neighbourhood of Santa Fe de Bogota, and the bark of which is known at that place by the title of *cascarilla naranjanda*, or orange coloured bark. From specimens which he received of the Cinchona originally observed by La Condamine, from which the celebrated *cascarilla fina de Uritusinga* was derived, he was induced to consider this tree as identical with the *C. lancifolia*. But Loxa, in the vicinity of which this fine bark is collected, is separated from Bogota, the residence of Mutis, and the locality of his *C. lancifolia*, by no less than eight degrees of latitude, and was never visited by this botanist, so that he had no opportunity of personally inspecting the plant in its natural state. While Mutis, five hundred miles to the north of Loxa, was thus identifying the *cascarilla fina de Uritusinga* with his own *cascarilla naranjanda*, Ruiz was claiming for his *C. nitida*, which grows at an almost equal distance to the south of that place, the honour of being the plant seen and described by La Condamine. But Ruiz also laboured under the disadvantage of never having visited Loxa, and like Mutis was compelled to form his opinions upon uncertain grounds. Humboldt and Bonpland, who were themselves in that neighbourhood, and had the opportunity of personally inspecting the tree in its native forests, assert

that it is neither the *lancifolia* of Mutis, nor the *nitida* of Ruiz and Pavon—plants which have since been satisfactorily ascertained to be identical—but a distinct species never before accurately described, which they name in honour of its first observer, *C. Condaminea*. Lambert, however, gives his opinion in favour of Mutis, stating that the *scrobiculi* on the leaves, which Bonpland regards as a permanent differential character, are found more or less numerous in all the species of the genus. Much weight is due to the opinion of this botanist, as he had specimens of both plants before him. A. T. Thomson in his dispensatory states that the *C. Condaminea*, if not precisely the same with the *C. lancifolia*, is evidently a variety of that species; and M. Guibourt, in a report recently presented to the Society of Pharmacy at Paris, coincides with Lambert. If this opinion can be relied on, the *C. lancifolia* would appear to be very widely spread over the mountainous regions of New Granada and Peru; for Bogota, where it was found by Mutis, is between 4° and 5° of north latitude; while the forests of Huamiles and Xauxa, where the *C. nitida* of Ruiz and Pavon, now acknowledged to be identical with it, was observed, are from 10° to 12° south of the equator; and the *C. Condaminea* occupies an intervening station between these two extremes. To this species are also reduced by the best authors the *C. glabra* and *C. angustifolia* of the *Quinologia* of Ruiz, and the *C. lanceolata* of the *Flora Peruviana*; and the process of condensation has been carried still further by professor Zea. But giving its due weight to the authority of Mutis, supported by the botanists who have been mentioned, it is impossible not to hesitate, unless with ampler means of forming a correct opinion than we are at present possessed of, in pronouncing Humboldt and Bonpland to have been mistaken; for these celebrated travellers, from their abundant opportunities of personal inspection, from their access to all the knowledge of their predecessors, and from their high scientific qualifications and habits of observation, are indisputably the first authority at present existing, on the subject of the natural history of the *Cinchona*.

In the remarks, therefore, which follow, the *C. Condaminea* of Humboldt and Bonpland, and the *C. lancifolia* of Mutis, will be considered separately, without the pronounciation of any decided opinion as to the identity of their botanical characters. It is proper, in the present place, to observe, that the causes which tend to perplex botanists in arranging the different species of the genus *Cinchona*, are particularly applicable in the individual case before us; as, in the language of Humboldt, "the *C. Condaminea* varies amazingly in its leaves."

The *C. Condaminea* grows under the fourth degree of south latitude, on the declivities of the mountains, at an elevation of from about one mile to a mile and a half, and in a mean temperature of 67° of Fahrenheit. It is confined to the neighbourhood of Loxa, where it grows near the village of Ayavaca, and in the vale of Rio Calvas. When full grown its stem is about eighteen feet high and a foot in thickness, with branches arranged in opposite pairs, of which the lower are horizontal, the higher rise upwards at the extremities. The leaves are shining, of a lively green colour, generally, when full grown, about four inches long and less than half as broad, and furnished with glands or small convex prominences upon their upper surface, with corresponding scrobiculi or depressions upon the under. In very young plants they are much broader in proportion to their length; and it is an observation of Humboldt, that the older the tree, the narrower is the leaf. The bark of the trunk is of an ash-gray colour, with clefts or fissures, and yields on incision a bitter, astringent juice; that of the small branches has a grayish hue, is smooth and glossy, and easily separable from the wood. It is this plant which yields the *cascarilla fina of Loxa*, the original Peruvian bark, which was valued so highly in Spain as to be the subject of royal monopoly, and was received in other parts of the world only through the channels of illegitimate commerce. The name of *crown bark of Loxa*, by which it is very generally known, evidently originated in this circumstance.

The *C. lancifolia*, or that variety of the species which was discovered by Mutis in New Granada, is a very handsome tree, from thirty to forty-five feet in height, with a trunk from one to four feet in diameter. It is quite solitary, never clustering like other Cinchonæ of the same neighbourhood, which are often so crowded together as to form almost closely connected shrubberies. This solitary character appears to pertain to all the more valuable species, and has led to their scarcity in the regions where bark has been long collected. When a tree has been felled, no suckers, as in the inferior species, arise from the roots, and assist to propagate the plant. Perhaps the superiority in size of the full grown *C. lancifolia* of Mutis over the *C. Condaminea*, as described by Humboldt, is attributable to the fact, that the bark has been gathered in Loxa from the earliest periods of its use as a medicine, while in New Granada the commerce in the drug is comparatively of recent date. The *C. lancifolia* requires a colder climate than the *C. Condaminea*, growing between the fourth and fifth degrees of north latitude, at an elevation upon the mountains of from four thousand five hundred to near ten thousand feet, and in a mean temperature of 61° of Fahrenheit. In the highest situations in which it is found the thermometer often sinks to 50°, and in the nights is sometimes at the freezing point. Judging from the botanical characters of this species as given by Mutis, it scarcely differs from the *Condaminea*, unless we consider the absence of glands upon the leaves as sufficiently distinctive. That it yields the same kind of bark is to be inferred from the fact, that the *cascarilla fina de Uritusinga* or crown bark of Loxa, admitted to be the product of the *Condaminea*, was considered by the experienced Mutis as identical with the *cascarilla naranjanda* derived from his *C. lancifolia*; while Ruiz and Pavon, without any communication with Mutis, and at the distance of nearly a thousand miles, claimed a similar identity for the bark of their *C. nitida*, now acknowledged to be the same tree with the *C. lancifolia*. The crown bark of Loxa is universally ranked among the pale barks, while that

of the *C. lancifolia* growing near Bogota is called "*orange coloured*;" and this difference of title might appear to indicate a difference in their nature; but the difficulty vanishes when we consider that the latter name was derived from the colour of the internal surface of the bark, the former from that of the powder, and that the pale barks are orange coloured in their natural state. It is probable that much if not most of the pale bark of commerce is derived from varieties of the *C. lancifolia*.

2. *C. cordifolia*.—This plant was originally described by Mutis, who found it in the mountains about Bogota; and it is said to flourish also in those of Loxa and Cuenca in the ancient kingdom of Quito. Like the other medicinal species it grows on the elevated plains, and on the declivities of the Andes, at heights varying from five thousand eight hundred to nine thousand five hundred feet. It is a spreading tree, fifteen or twenty feet high, rising on a single, erect, round stem, which is covered with a smooth bark of a brownish gray colour. The smaller branches have a lighter coloured bark, and are covered with a fine down. The leaves vary much in form, but some of a heart shape are to be found on almost every branch, and have given origin to the name of the species. They are usually about nine inches long, smooth and shining on the upper surface, ribbed and pubescent on the under. The down upon the leaves and smaller branches has given rise to the name of *velvet bark*, by which the tree is known to the common people of New Granada.

In the British Pharmacopœias the *C. cordifolia* is recognized as the source of the officinal yellow bark. It undoubtedly produces the variety known to the Spaniards as the *quina amarilla* or *yellow bark of Santa Fe*: but this is by no means the article which circulates in the commerce of this country, England and France, by the name of *yellow* or *Calisaya bark*, and which is so largely consumed in the manufacture of Sulphate of Quinia. This will at once be rendered obvious by the statement, that the valuable yel-

low or Calisaya bark is derived exclusively from the western coast of South America on the Pacific; while the *C. cordifolia* of Mutis flourishes most about Bogota, of which the commercial outlet is Carthagena on the northern coast of the continent. The fact seems to be that this species yields the yellow Carthagena bark, which is probably identical with the *Quinia Amarilla de Santa Fe* of the Spaniards; and the British colleges have simply followed Mutis in ascribing the yellow bark to the *C. cordifolia*, without taking into consideration the total want of similarity, except in the colour, between the medicine known to him by that title, and the valuable variety which they intended to adopt as official. The yellow bark described by Thomson in the London Dispensatory as derived from the *C. cordifolia* is in all respects identical with the *Calisaya*, and totally different from the yellow Carthagena bark, which is probably the real product of this species. In the late edition of the United States Pharmacopœia this error of the British Colleges has been corrected.

By some authors, the *C. pubescens* of Vahl and the *C. hirsuta* of the Flora Peruviana are considered mere synonyms of the *C. cordifolia*: but others pronounce them to be distinct; and the latter opinion is supported by the fact, that though these trees grow in Quito and Peru, no bark is brought from the Pacific identical with the yellow bark of Carthagena, which it can hardly be doubted is the product of the *C. cordifolia*.

3. *C. pubescens*.—This was described and named by Vahl, who received his specimens from the collection of Jussieu at Paris, whither it was brought by Joseph de Jussieu from the neighbourhood of Loxa. It is admitted to be identical with the *C. ovata* of the Peruvian Flora even by the authors of that work. Bonpland has pronounced it to be the same with the *C. cordifolia*; but Lambert, though he admits their similarity, decides from dried specimens in his possession that they are quite distinct, and states the characters in which they differ. The *C. pubescens* grows about

Loxa, also in the warmer regions of the Andes near Pozuzo and Pano, and in the forests of Huanuco to the north west of Lima. It resembles the *C. cordifolia* in the pubescent character of its leaf, from which its name was derived. It contributes to furnish the bark of commerce, though it is impossible to ascertain with certainty the particular variety which it affords. Ruiz calls its product *cascarilla palido*; and it is not improbable that a portion of the pale bark of Loxa and Lima is derived from it.

4. *C. Hirsuta*.—Humboldt, upon the authority of Zea, erroneously referred this species to the *C. cordifolia*, and the error has been copied by De Candolle. The two species have not the least resemblance; and Zea himself has acknowledged his mistake*. The *C. Hirsuta* derives its name from the hairs on its leaves and flowers. It grows in lofty and cold situations on the Peruvian Andes, near Pillao, and Acomayo. It attains the height of about fifteen feet, and is then surrounded by shoots springing upwards from its roots, and forming with the parent tree, an oval surface, having the appearance of a dome. Its bark is called *delgada* or slender, is very thin, and may be ranked among the pale varieties of English and American pharmacy, the gray of the French. Though a valuable bark, it is seldom gathered, as its extreme fineness renders its collection much less profitable than that of the larger varieties.

5. The *C. purpurea* of the Flora Peruviana, which Lambert identifies with the *C. Scrobiculata* of Humboldt and Bonpland, grows in the mountains of Panatahuas and Huanuco. The tree examined by Humboldt flourishes near the city of Jaën de Bracamoros, where it forms immense forests. It is a large tree, attaining the height of forty feet, with leaves from four to twelve inches in length, and from two to six in breadth. Humboldt and Bonpland tell us that the bark of its younger branches so much resembles that of the

* Lambert's illustrations, A.D. 1821.

C. Condaminea, that it is difficult to distinguish the two varieties. It cannot, therefore, as stated by De Candolle, be one of the red barks of commerce; for the product of the *C. Condaminea* is universally classed among the pale or gray barks. It is called by the natives *cascarilla fina*, and probably contributes to form the packages which come to us under the name of Loxa bark. The *C. purpurea* yields a bark denominated *cascarilla morada*, or mulberry bark. It is brought into the market, mixed with the other pale barks from the same neighbourhood, and as Lima is the entrepot for the produce of the country about Huanuco, it probably takes the name of that city. The pale barks of Lima, however, are all confounded in this country with those of Loxa, which shows the folly of attempting to designate the particular varieties from the places where they grow.

6. *Cinchona oblongifolia*.—This tree was discovered by Mutis in New Granada, where it is very abundant, especially in the vicinity of Mariquita, in about four degrees of north latitude. It grows at an elevation of from four thousand to eight thousand five hundred feet, and is one of the largest trees of the genus, rising to a great height, on a single, erect, round stem, which is covered with a smooth, brownish ash-coloured bark. The leaves which are opposite have an oblong oval shape, and attain a great size, being frequently one or two feet in length. Botanists generally agree with Humboldt and Bonpland in uniting with this species the *C. Magnifolia* of the Flora Peruviana, which grows to the south of the equator upon the mountains of the Panatahuas, near Cuchero, Chinchao, and Chacahuassi, where it was seen by Ruiz and Pavon in the year 1780. Lambert, however, describes them as distinct species.

The *C. oblongifolia* is called by the natives *cascarilla de flor de azahar*, from the resemblance of its flowers in odour to those of the orange. Till very recently it has been considered as indisputably the source of the best red bark of commerce, which is ascribed to it by the British Pharmacopœias. A little reflection might have convinced those ac-

quainted with the commerce in bark, that this reference was incorrect; for who ever hears of the officinal red bark as coming from Carthagena; and yet this is the port from which the product of the *C. oblongifolia* growing in New Granada is shipped. The mistake originated in that implicit acquiescence with which the statements of Mutis have been received. The tree does, undoubtedly, as asserted by Mutis, produce a red bark; but it is the red *Carthagena* bark, a comparatively valueless variety, wholly distinct from the genuine red bark, brought from the Pacific, and so highly esteemed as a febrifuge. There will be occasion hereafter to say more on this subject.

7. *Cinchona micrantha*.—This is a large and handsome tree, which was seen for the first time by Tafalla in the year 1797, in the cold and elevated regions of San Antonio Playa Grande, in the Peruvian Andes. Its bark is called in the country *cascarilla fina*, a name which indicates the value attached to it by the natives: but we are in possession of no information by which it might be identified among other varieties.

8. The *C. macrocarpa* of Vahl, identical with the *C. ovalifolia* of Mutis, inhabits the provinces of Loxa and Cuenca, where it forms considerable forests. It was also found by Mutis in New Granada, and grows as far north as Santa Martha. It derived its name from the extraordinary magnitude of its fruit. Its bark is called by the Spaniards *Quina Blanca* or white bark, probably from the colour of the epidermis. May not this species be the source of that commercial variety brought from Maracaybo and Santa Martha, in the neighbourhood of which the tree is said by Humboldt to be found?

9. The *C. glandulifera* of the Flora Peruviana is a shrub about twelve feet high, having usually three or four stems united together, each about three inches in diameter. It was found by Ruiz and Pavon in the forests of Chicoplaya, and on the banks of the Taso, to the north of Huanuco, where the temperature is moderate. Its bark is among those which

the French call *gray*, and is more particularly designated by the name of the Peruvian city near which it grows; although, as in the case of the Loxa barks, those of Huanuco are by no means confined to a single species.

Besides the species already enumerated, several others probably furnish more or less of the bark of commerce. Among these may be mentioned; 10. *C. ovalifolia* of Humboldt and Bonpland, a shrub from six to nine feet high, inhabiting the province of Cuenca, where it forms considerable forests, and is called by the natives *cascarilla peluda* or hairy bark; 11. *C. caduciflora* of Humboldt and Bonpland, a very large tree, more than one hundred feet high, growing near the city of Jaën de Bracomoros, and yielding a bark called *cascarilla bova* by the Peruvians; 12. *C. acutifolia* of the Flora Peruviana, a tree twenty-four feet high, discovered by Tafalla in the Peruvian mountains north of Huanuco, near the Taso, and yielding the *cascarilla hoja aguda*; and 13. *C. dichotoma*, which grows to the height of fifteen feet, was discovered by the same botanist in the same region as the preceding species, and affords the bark called *cascarilla aharquilla* by the natives.

Besides these species, several others might be added which, though named and described by botanists, are not known to furnish any of the bark of commerce. Such are the *C. Macrocalyx*, *C. Pelalba*, and *C. Crassifolia* of Pavon, quoted by De Candolle; and the *C. Pavonii*, *C. Humboldtiana*, *C. Rotundifolia*, and *C. Stenocarpa*, described by Lambert upon the authority of Pavon, and from specimens in his own possession.

In all the preceding species the corolla is more or less hairy or woolly. The *C. Rosea* is the only one strictly belonging to this genus which has the corolla entirely smooth. It rises usually to the height of fifteen feet, and when in blossom presents a very handsome appearance, as well from the

richness of its foliage, as from the beauty of its flowers, with which the natives adorn their churches. It inhabits the forests of the Andes near Pozuzo, and San Antonio de Playa Grande. Its bark is called *cascarilla pardo*.

[To be continued.]

SELECTED ARTICLES.

ART. V.—*On the Balsam of Copaiba ; extracted from a Report made to the Société de Pharmacié. By MM. Lecanu, Blondeau and Guibourt.*

The gentlemen above named were appointed to examine a paper presented to the Society of Pharmacy, by M. Fauré, Pharmacien, on the solidification of Turpentine and the Balsam of Copaiba, by means of calcined magnesia. M. F. has treated different parcels of turpentine with calcined magnesia, and the several mixtures became solid more or less promptly, according to the quantity of magnesia employed. He therefore proposed to prepare pills of turpentine with fourteen gros of thin, transparent turpentine, and half a gros of magnesia calcined ; and he stated, that at the end of twelve hours the mass would assume the pilular consistence, and in four or five days become friable. He thought that advantage might be taken of this property of turpentine to incorporate with it a larger proportion of volatile oil than it naturally contains, in order to facilitate its application in neuralgic affections, for which it has lately been recommended. Consequently he has proposed the following formula.

Turpentine, thin and transparent,	6 gros.
Volatile Oil of Turpentine,	2 gros.
Calcined Magnesia,	$\frac{1}{2}$ gros.*

* One gros is equal to 59.1 troy grains.

M. F. has also observed, that the Balsam of Copaiba of commerce varies in colour, odour and consistence, according to the length of time it has been suffered to drain after collection, and to the kind of vessels in which it has been preserved. This deficiency of consistence, according to him, renders it necessary to augment the proportion of calcined magnesia, or at least to expose the balsam to the open air for a few days, in order to evaporate a portion of the essential oil which renders it too fluid.

The consistence may also be augmented by the addition of a little turpentine, and then it will solidify though castor oil should be present.

Balsam Copaiba, that will not solidify with one-sixteenth of magnesia, will assume a pilular consistence by the previous addition of one-sixth of turpentine in six or eight days. And that, which is susceptible of solidification with one-sixteenth of magnesia, may be deprived of this property by the previous admixture of one-twentieth of castor oil: but, if before the magnesia be added to such adulterated balsam one-fifth of turpentine be combined with it, the solidification will still take place, notwithstanding the presence of the castor oil.

So far, then, according to this statement, is the magnesia from being a test of the purity of Copaiba, that it is liable to lead the pharmacien into error, who should rely on it as a certain means of detecting the sophistication of this article.

These are the principal facts contained in the note of M. F., and the committee to whom it was referred were surprised at the statement as one of them had some time before arrived at almost entirely opposite conclusions.

This committee state, that four specimens of Balsam of Copaiba of commerce were procured.

No. 1 was transparent, of a deep yellow and of a tolerably thick consistence. Tested with ammonia in the proportion of three drops of balsam to one of the alkali, its transparency was completely impaired, which fact was then con-

sidered as a proof that it was adulterated with some fixed oil. No. 2 was perfectly transparent, very liquid, and of a pale yellow. No. 3 was opaque, (*troublé*), and No. 4 was transparent, but it became opaque afterwards, and deposited a portion of water.

The three latter, tried with ammonia, became perfectly transparent after some minutes of agitation, which induced the belief that they were of better quality than No. 1; but being mixed with one-sixteenth of calcined magnesia, No. 1 only, promptly hardened and assumed a pilular consistence. No. 4 was much thickened without becoming hard enough to form pills; and Nos 2 and 3 were not augmented in consistence.

Desirous of ascertaining the cause of this difference in the results, and possessing two methods, equally recognized for testing the purity of Balsam of Copaiba, 2 gros of each number were treated with 12 gros of alcohol of 36°. All of them left an oleiform residue, but those of Nos 1 and 4 were sufficiently thick and coloured, while those of Nos 2 and 3 were white and liquid.

The floating liquid was decanted and replaced by an ounce of new alcohol: then No. 1 left only a very small residue, but formed a resinous, solid, transparent coating on the bottom of the bottle. This residue is a resin, insoluble in alcohol, and approaching those of anise and copal. No. 4 left a similar residue, but somewhat unctuous; as to Nos 2 and 3, the residue was oily and liquid and acquired by boiling in water or exposure to the air a strong rancid odour. Thus, these two balsams, which, tested by ammonia, appeared to be superior, contained, nevertheless, a fixed foreign oil; and as they are the same which acquired no consistence by the addition of calcined magnesia, it becomes apparent that this alkaline base still offers the best means of testing the purity of Balsam of Copaiba. First conclusion opposed to M. F.

The experiment was then tried on copaiba, No. 2, to ascertain if by evaporation of its volatile oil, or by its transfor-

mation into a resin, it would acquire the property of hardening with magnesia.

One ounce was very carefully weighed in an uncovered capsule; then covered with a simple paper, and weighed from time to time. A singular fact, but nevertheless easy to explain, occurred at the first weighing, which was that the capsule was slightly augmented in weight at the end of two days.

Afterwards it gradually diminished in weight, without however exceeding a loss of two or three grains. At the end of five days the balsam had become very thick, and was mixed with one sixteenth of calcined magnesia without acquiring any greater consistence.

This fact is also contrary to that ascribed by M. F.

Finally, no advantage was acquired by adding to the balsam Nos 2 and 3, a quantity of fine turpentine, as it did not sensibly augment the property of hardening with magnesia.

All of these experiments were made long anterior to the communication of M. F., nevertheless the following were tried to test the truth of one or the other. Fourteen gros of fine turpentine were mixed with half a gros of calcined magnesia, and according to the statement of the author of the note, it ought to acquire the pilular consistence in twelve hours, and become friable in four or five days; but at the end of three days, it had only assumed the consistency of very thick turpentine.

Another mixture of one ounce of turpentine with half a gros of calcined magnesia (the proportions indicated by M. Mialhe), became firmer, but not sufficiently so to form pills.

A more conclusive experiment was tried by mixing four gros of copaiba with eighteen grains of magnesia, and in forty-eight hours the whole had become of a good pilular consistence.

When forty-eight grains of turpentine were mixed with the four gros of copaiba, and eighteen grains of magnesia added to them, the mass was less consistent at the end of eight days than the preceding.

Thus, contrary to the assertion of M. F., turpentine cannot be employed to falsify the Balsam of Copaiba, and the calcined magnesia may be considered as still an excellent test for the purity of this article. The reporters do not believe that it is possible to incorporate in turpentine pills made with magnesia, a notable quantity of volatile oil; but they think, that by employing one gros of magnesia for one ounce of the turpentine, the mass may be formed into pills very superior to those made in the ordinary way, either by using turpentine that has been dried, or reduced to a proper thickness by the admixture of a large quantity of powder.

The state of the magnesia in the turpentine, and the solidified Balsam of Copaiba, forms another very interesting subject for investigation.

According to M. F., when a mixture of magnesia and turpentine is treated with alcohol, the whole of this base is left with all its alkaline properties; which has induced the belief that it acts as an absorbent, and exists in the state of simple mixture, and not as a chemical combination.

Notwithstanding, however, that the influence exercised by the magnesia on the turpentine be much more feeble than that which this earth exerts over copaiba, still it is difficult to conceive that there is not a chemical union between a part of the magnesia and the resin of turpentine.

M. F. stated that if solidified copaiba be treated by boiling alcohol, a portion is dissolved, leaving the magnesia with which it was combined. But the resinous part remained undissolved in any quantity of alcohol that might be employed; while it was readily soluble in sulphuric ether, leaving a less quantity of magnesia than was left from the alcoholic solution. It is therefore to be inferred that the magnesia was not all separated by these experiments, and the committee have always thought that the magnesia solidified and saponified the resin, and that it was this compound which dissolved the volatile oil, and gave to the mass a medium consistence between the fluidity of the latter and the hardness of the saponified resin.

Our experiments, they observe, do not prove that the magnesia exerts no action on the volatile oil; but they induce us to think that this base acts equally on the two constituent parts of copaiba; and that which they do prove without contradiction, is, that the magnesia exists in a state of combination, and not as a mere absorbent.

By treating with sulphuric ether two gros of copaiba that had been solidified for a month with one sixteenth of calcined magnesia, there remained at first a considerable flocculent deposit, which in part disappeared by subsequent treatment with ether. There finally was left a hard, white, tenacious, insoluble residue, which became dry and pulverulent by desiccation. This was not pure magnesia as M. F. believed, but a combination of magnesia and resinous matter; and it is very probable that this resinous matter is that which is insoluble in alcohol, and which exists only in small quantities in the copaiba, but which composes almost entirely the resins of anise and copal.

The ethereal solution, filtered, and allowed to evaporate spontaneously, left a substance having the transparency and colour of copaiba, but much thicker. Calcined in a crucible it left a considerable quantity of magnesia; thus proving there existed a combination of this base with the resin and perhaps with the oil of copaiba, and this combination is soluble in ether.—*Journal de Pharmacié, Sept. 1830.*

At a sitting of la Société de Pharmacié of Paris on the 10th of November 1830, a letter was received from M. Fauré of Bordeaux, containing some observations on the report which was made to the society on his memoir, relative to the solidification of Balsam of Copaiba by magnesia. He believes that the cause of the difference, between his results and those obtained by the reporters, will be found to exist in the nature of the turpentine on which they severally operated. M. Fauré sent a specimen of turpentine which he had employed in his experiments, and requested that the committee would repeat theirs with that article. He believes equally that the contradictory results obtained by himself

and the committee with the Balsam of Copaiba are to be attributed to the difference in the purity of this drug.—*Journal de Pharmacié, Nov. 1830.*

ART. VI.—*On the Bitter of Aloes employed in colouring.*

According to professor Liebig, when eight parts of nitric acid are distilled with one part of aloes, and water is added to the remaining liquid, a resinous substance of a yellow red colour is deposited, which, by washing, becomes pulverulent.

A larger quantity is procured by using weak nitric acid, and this is the substance known by the name of "*Bitter of Aloes.*" When the yellow liquid in which this substance is formed is evaporated to a certain point, large yellow, opaque, rhomboidal crystals are formed, which are a combination of oxalic acid, and the Bitter of Aloes. After five or six crystallizations, this latter separates from the oxalic acid, and combined with salifiable bases, it affords detonating salts. It owes this property to the cyanic acid which it contains, united with a particular substance analogous to that which has been named resin of indigo. The Bitter of Aloes dissolves in from eight hundred to one thousand times of cold, but it is more soluble in hot water, and its solution is of a beautiful purple. When silk is boiled in it, it becomes of a purple colour that resists the action of all the acids, except the nitric, which changes it to a yellow; but by washing it in cold water the purple colour will be restored.

ART. VII.—*Memoir on the Quantity of Extract furnished by different species of Sarsaparilla. By M. Thubeuf, Pharmacien at Paris.*

It has long been the practice with many physicians to give their preference to certain kinds of sarsaparilla, and for others, on the contrary, to withhold their confidence from all of them. In consequence of these discordant opinions, and for want of sufficient proofs, some, less exclusive in their opinions, have directed them indiscriminately, or at least appeared by their silence, to attribute to every variety properties equally medicinal.

The nature of the medicinal principle of the sarsaparillas not having yet been demonstrated by chemical analysis, each conceives his own opinion to be founded in reason, and it is also more than probable that inferior qualities are thrown into market.

It is generally admitted at the present day, that Sarsaparilla does not abandon all its active properties to water, even boiling, and that the employment of alcohol of 22° is absolutely indispensable to deprive it of all its efficient material. The experiments I have performed lately, have confirmed the opinion I entertained of this excellent process, and it appeared to me that a work which would establish correctly the quantity of extract furnished by each species of sarsaparilla, according to the mode indicated, would enable us for the present to estimate with tolerable correctness, the qualities of these roots; I have therefore undertaken it with all the perseverance and care, required by such an important operation.

The following is the process which I have employed, each sarsaparilla being without stems, and well cleansed.

After cutting the sarsaparilla it was macerated for forty-eight hours in a sufficient quantity of water, when it was taken out and submitted to a press. It was then bruised with a pestle, in order to immerse it for four days in a suf-

sufficient quantity of alcohol of 22°. The aqueous infusion after being strained, was evaporated to the consistence of an extract by a vapour bath, and the first alcoholic maceration being finished, the Sarsaparilla was pressed, the liquor suffered to settle, filtered and distilled. The hot product remaining on the water bath, was filtered and reduced to the form of an extract; and the sarsaparilla thus treated, was taken up a second and a third time by alcohol of 22°, in which it was macerated, and each maceration submitted to a water bath of about 60° cent. for twelve hours. When arrived at this point it was suffered to cool, and was expressed; and finally the sarsaparilla was put into a sufficient quantity of cold water for forty-eight hours.

The alcoholic liquors of the second and third macerations after the aqueous infusions were submitted to the same operations as that of the first maceration in alcohol, and converted into extracts.

The second aqueous maceration was subjected to the press, strained, and reduced by evaporation to the form of an extract.

THE RESULTS.

Red Sarsaparilla of Jamaica.—Six pounds of this sarsaparilla produced,

1st operation,	Maceration in water	3vj 3ij	} 3xxi. 3ij.
2d	1st maceration in alcohol at 22°	3vij 3v	
3d	2d maceration in alcohol at 22°, followed by an infusion of 12 hours at about 60° cent.	3iij 3j	
4th	3d maceration in alcohol at 22°, followed also by an infusion of 12 hours at about 60° cent.	3j 3ij	
5th	2d maceration in water	3iij	

Honduras Sarsaparilla.—Six pounds of this sarsaparilla produced,

1st operation	3ij	3iv	} xiv
2nd	3iv	3vj	
3d	3ij	3vij	
4th	3j	3iij	
5th	3j	3iv	

Sarsaparilla of Portugal.—Six pounds of this sarsaparilla produced,

1st operation	3v	3iv	} 3xiiij. 3iss.
2nd	3iij	3ivss	
3d	3j	3vss	
4th	3j	3ijss	
5th	3j	3j	

After having thus ascertained the quantity of extract furnished by each species of sarsaparilla, I became curious to know what product could be obtained from the stems or stalks, deprived carefully of all those portions of the root which are usually attached to them. The following results surprising only by the quantity of bad product will serve, if that were necessary, to induce us to reject, as entirely useless, this part of the plant.

Stems of the Sarsaparilla.—Six pounds of the stems, cut fine and bruised, were submitted to the same processes as the sarsaparilla, and yielded the following products,

1st operation	3v	3ij	} 3ix. 3iiijss.
2nd	3j	3ivss	
3d	3j	3ij	
4th		3vj	
5th		3v	

All the macerations of the stems, with the exception of the first, which was of a deep black, were of a peculiar yellowish colour. The liquor remaining in the water bath after the distillation had the appearance of water in which rhubarb had been boiled, and they deposited a considerable quantity of feculent matter. The extract was without

a well pronounced bitterness, and had, besides, a very disagreeable taste; it was almost totally destitute of that belonging to the extract procured from good sarsaparillas.

From the observations made during this investigation, I feel confident in recommending the above process for the preparation of the extract of sarsaparilla; which may be modified by suppressing the fourth and fifth operations. It would also be well, to prolong to four days each the first and second alcoholic macerations. I am persuaded that the compounds made with such an extract would be found to possess all the properties inherent in the sarsaparillas. They would be more active in proportion as the extracts were more concentrated, either by the vapour or the water-bath, for it cannot be doubted that these preparations are sensibly altered by the naked fire, not by the volatilization of some principle, as Galileo Palotta thought, but as M. Souberrain observed by the direct action of caloric.

I may remark here, that the aromatic principle of the sarsaparillas resides in a greasy fixed matter, which I have insulated, and which, as is the case with all those found in sarsaparilla, is united with a large quantity of acid. Not having been able to procure at the time the other species of sarsaparilla that I wished to submit to the same treatment, the prosecution of the examination is postponed to a future period.—*Journal de Pharmacie*, Nov. 1830.

ART. VIII.—*On the Adulteration of the Hydriodate of Potash.* By J. Pereira, Esq. F.L.S. Lecturer on Chemistry, *Materia Medica*, &c.

Having in two instances lately met with Hydriodate of Potash much adulterated with the carbonate of potash, and

believing that this adulteration is very common, although it has not hitherto been noticed, I have taken the liberty of drawing the attention of the profession to this subject, through the medium of the London Medical and Physical Journal, and of pointing out the easiest methods of detecting it.

It is well known that iodine is very sparingly soluble in water; but that water holding in solution Hydriodate of Potash is capable of dissolving a larger quantity of iodine. In the general dispensary a solution termed liquor iodina is kept, made on this principle; that is consisting of iodine dissolved in a solution of the hydriodate. My attention was first directed to the adulteration of this salt by one of my assistants, who informed me that he had twice failed in making the liquor. Thinking that he might have committed some error, I attempted to make it myself, but found that the iodine was only partially dissolved. Of course, I immediately inferred that either the iodine or the hydriodate was impure. The iodine, however, I soon found was quite pure, and I then directed my attention to the hydriodate. This salt was observed to contain but very few crystals, those that were noticed, however, had the appearance of the hydriodate.

The greater part of the salt seemed as if it had been heated so as to destroy its crystalline form. To the taste it was powerfully alkaline, and affected very strongly vegetable colours. These characters led me to suspect that it contained an alkaline carbonate.

Muriatic acid added to a solution of it produced effervescence; the same takes place with the pure hydriodate, owing to the separation and decomposition of the hydriodic acid; but in the case of the suspected salt, however, the gas that escaped was conducted by means of a curved tube into lime water, which it immediately rendered milky, proving that carbonic acid was present. A solution of the suspected salt added to lime water, gave a white precipitate, soluble with effervescence in muriatic acid. The same coloured precipitate took place when the suspected solution was added to a solution of muriate of barytes, and effervescence

was produced by the addition of muriatic acid. Sugar of lead gave a white precipitate of carbonate of lead, instead of a beautiful yellow one of iodide of lead, which the true hydriodate gives. Hence, it was clear that an alkaline carbonate was present; but was it potash or soda? To determine this I proceeded as follows.

It is well known that the salts of potash impart to flame a beautiful pale violet colour; but those of soda a pure yellow. Hence, if a salt of soda be mixed with a salt of potash, its presence may be detected by the alteration in the colour of the flame. On this principle, I determined that the substance used to adulterate the hydriodate was carbonate of potash. A piece of clean pack-thread was wetted with a strong solution of the suspected salt. The wetted end was then dipped into the cup of tallow immediately surrounding the wick of a candle, so that it might be enveloped in melted tallow. It was then applied to the exterior of the flame, not quite in contact with the luminous part, but so as to be immersed in the cone of invisible but intensely heated air which envelopes it. An irregular sputtering combustion of the tallow on the thread took place, and the invisible cone of heat was rendered luminous, of a *pale violet colour*. Hence, then, it did not appear, that any salt of soda was present; otherwise the colour of the flame would have been rendered more or less yellow.

Having thus satisfied myself that the impurity was carbonate of potash, I next proceeded to ascertain the quantity of it. Some of the salt was heated in a glass tube over a spirit lamp to deprive it of water. Ten grains of the salt thus dried were dissolved in distilled water, and excess of muriate of barytes added. A precipitate consisting of carbonate of barytes took place, which was collected and dried by a water bath; it weighed eleven grains. Now eleven grains of carbonate of barytes consist of

Carbonic acid	2.42
Barytes	8.58

Hence, then, there must have been 2.42 grains of carbonic acid in 10 grains of the suspected salt. Assuming from the

strong alkaline taste of the salt, its powerful effect in turning green, vegetable blues, and from its precipitating sulphate of magnesia, that the carbonic acid was combined with potash, in the proportion to form the carbonate, (sub-carbonate of the pharmacopœia,) it must therefore have been combined with 5.28 grains of potash.

Consequently the adulterated salt consisted of

Iodide of Potassium,*	2.30
Carbonate of Potash (sub-carbonate P. L.),	7.70
	<hr/>
	10.00

The quantity of iodide of potassium is here inferred from the quantity of the carbonate of potash present. That this inference is correct, there can be, I think, but little doubt; certainly the quantity of iodide cannot have been larger than is here stated. Now assuming that the equivalent for iodine is 125, it follows that 2.30 grains of iodide of potassium contain about 1.66 of iodine. In the following experiment I obtained 1.5 of iodine, which is a very close approximation, particularly when we consider the very volatile nature of this substance.

Ten grains of the suspected salt perfectly dried were introduced into a glass tube, and strong nitric acid added to it by means of a dropping tube. Effervescence took place, and the iodine vapour which was evolved condensed on the sides of the tube.

The iodine was then cautiously sublimed into another tube inverted near the first one. To guard against moisture, the second tube which contained the iodine was placed under an exhausted air pump receiver, with sulphuric acid for a few minutes. The iodine weighed 1.5 grain: hence, we have a right to conclude, that the above mentioned quantity of iodide of potassium is correct. If, as I suspect, the adulteration of Hydriodate of Potash be frequently practised, it will explain why such different statements of the effects of

* When *Hydriodate of Potash* is heated to drive off its water, it is converted into *iodide of potassium*; but by solution in water the latter is converted into the *Hydriodate of Potash*.

this remedy have been made ; when pure it is a most valuable remedy in glandular and other affections. But it must be evident to every one, that very different effects result from the use of sub-carbonate of potash instead of the hydriodate.

I shall now make a few remarks on the best methods of detecting adulterations of this salt. The substances most likely to be met with are the carbonates, sulphates and murfates : which may be detected thus,

1. If the carbonates are present they may be known by lime water, muriate of barytes, or sulphate of magnesia, producing a white precipitate in a solution of the suspected salt, soluble with effervescence in muriatic acid. Sugar of lead also produces a white precipitate, which effervesces on the addition of muriatic acid, chloride of lead being precipitated.

I would, however, here remark, that if any of the above precipitates be small, and the quantity of fluid large, the effervescence may be hardly, or not at all perceptible, owing to the solution of the carbonic acid in the fluid.

It may happen also, that although the hydriodate is adulterated with the carbonate of potash, yet the white precipitate produced by muriate of barytes, may not be *wholly* soluble in muriatic acid, owing to the carbonate of potash of the shops usually containing some sulphate mixed with it.

2. The *sulphates* (as of soda,) may be detected by a solution of sulphate of magnesia producing no precipitate ; but a solution of muriate of barytes produces a heavy white precipitate, insoluble in muriatic acid. This adulteration is, I believe, very rare.

3. The muriates, according to Chevallier and Robiquet, are frequently present. Indeed, the latter chemist states that they may be one of the results of the operation to form the hydriodate. The peculiar saltish taste would lead us to suspect the presence of either muriate of soda or potash. However, we may determine this chemically.

Add a solution of nitrate of silver to the suspected solution, and a yellowish white precipitate will fall down ; to

which add excess of liquor ammoniæ and stir the mixture. After letting it stand for a little time, filter. If the filtered liquid throw down a white precipitate on the addition of nitric acid, the suspected salt contained a muriate. The theory of this process is very-simple. Nitrate of silver throws down in a solution of the pure hydriodate, a yellowish white precipitate of iodide of silver, *insoluble* in ammonia. From the solution of a muriate, the nitrate of silver throws down a white precipitate of chloride of silver, soluble in ammonia. Hence, then, when a solution of nitrate of silver is added to a solution of the hydriodate, adulterated with a muriate, we obtain a precipitate consisting of the iodide and chloride of silver. Ammonia dissolves the chloride but leaves the iodide. When the liquid is filtered and an acid is added, the chloride of silver is precipitated.

The above is the only easy process for detecting the muriates that I have been able to contrive. Robiquet has published one much more complicated and less certain in its results. It is as follows :

“Take a determinate weight, of quite pure hydriodate (suppose ten grains) : take also, the same quantity of suspected salt, dissolve them separately in the same quantities of water ; and introduce them into small tubulated retorts, to which are attached receivers. Introduce into each of these vessels through the tubulure, excess of nitric acid, so as to decompose the hydriodate of potash ; nitrate of potash will be formed and iodine separated. By the application of a sufficient degree of heat, the whole of the iodine may be volatilized. The iodine in each vessel is to be separately dried and weighed. The difference in weight will indicate the purity of the suspected salt. Afterwards the two distilled liquids are to be tested with nitrate of silver. The liquid obtained from the pure hydriodate will not give any precipitate with the nitrate of silver ; whereas that, which arises from the hydriodate adulterated with a muriate, will produce a white precipitate.

See Dict. des Drogues, tome 3; art. Hydriodate de Potassa.

ART. IX.—*Some account of the Copperas Mines and Manufactory in Strafford, Vt.* By Dr John Locke.

[From the American Journal of Science and Arts, Vol. III. p. 326.]

The mine is situated about twelve miles from Dartmouth College, and about five miles from Thetford, Vt. It is near the summit of a hill which rises probably two or three hundred feet above the bed of the streams in the vallies below.

The gangue in which it occurs is mica slate, the strata of which, are very highly inclined to the horizon, and present their long ridges above the surface in various parts of the hill, particularly at its summit. There are occasionally veins of quartz in the slate. The rocks for several miles around are, as far as I observed, principally mica slate. There are no particular indications of iron at any considerable distance from the mass of the mine, but the transition from the slate to the pyritic ore is abrupt. The mine has been opened obliquely up the hill, about twenty rods in length and four in breadth. The ore has been traced near half a mile, running pretty much in the direction of the strata of the slate.

The ore consists of an aggregate of quartz and undecomposed pyrites in small grains. In its granular aggregation, the ore resembles the quartz and feldspar in fine grained granite. The pyrites constitutes the greater proportion. Many specimens contain abundance of needle shaped crystals of schorl. Its fracture possesses a metallic lustre, and most of it approaches in colour to pale brass, from which it varies to steel gray.

The ore is very compact and is obtained for manufacturing by drilling and blowing. In manufacturing it into copperas it goes through the several operations of decomposition, lixiviation and evaporation, each of which constitutes a distinct operation. For several years the manufacturers effect-

ed the decomposition in the following manner : the ore was broken into fragments of a foot or less in diameter, and heaped upon inclined scaffolds erected and floored with plank for the purpose. Thus exposed to the action of air and moisture, it very gradually decomposes at the surface. Thus from the same mass of ore a solution was obtained, year after year, either by the rains or by the application of water by other means. The solution was received from the inclined scaffolds in plank cisterns.

For three or four years past they have adopted a more expeditious method of decomposition, which was discovered in the first place by accident. They break the ore into much smaller fragments, three inches and less in diameter, and throw them into a convenient heap, taking care to leave air holes at the base, so as to allow the air to pass freely through the heap. On applying water, the decomposition commences, and so much heat is evolved, as presently to raise the temperature of the heap to such a degree as to char wood, boil water, sublime sulphur, &c. Great quantities of sulphurous acid gas are evolved during the process and in the course of three or four weeks the whole becomes disintegrated and ready to fall into the state of powder. It then, by lixiviation with water, yields all its copperas at once; the process is performed in a plank cistern.

When I visited the mine last summer, one of these artificial volcanoes happened to be burning. The sulphurous acid produced had run down the side of the hill below, and killed the grass and leaves of the trees for several rods, as completely as though they had been scorched by fire. It was even dangerous to approach it, except on the windward side. I thrust a stick into it, and it was charred to blackness in a few minutes. I obtained needle-shaped crystals of sulphur which had evidently been formed on the external surface of the heap by sublimation. I was informed that the sulphur usually melted and ran down into the cavities, and that it frequently burned with flame in various parts of the heap.

The manufactory in which the process of evaporation and

crystallization are performed, is placed on the declivity quite below the mine. This gives great facility to all the operations, allowing the various reservoirs to be so arranged one above another, that the liquor may be transferred from one process to another merely by means of a trough.

The bottoms of the evaporating vessels are of lead, and about ten feet square; the sides are of wood about three or four feet high. The bottom is supported by a number of parallel brick walls, placed at a small distance from each other. The avenues or arches between these walls communicate at one end with the arch in which the fire is placed, and at the other with the common flue.

The ore is a sulphuret of iron, with a small portion of copper; and the solution, first obtained, is a sulphate of iron and copper, with an excess of acid. During the process of evaporation a leaden vessel, having its sides perforated and containing fragments of old iron is suspended in the liquor. The iron, at the same time that it neutralizes the excess of acid, decomposes the sulphate of copper and the copper is precipitated in the form of a fine powder, which the workmen call "copper mud." In a conversation with professor Cleaveland upon this subject, he observed, that he could not conceive why the copper did not form a pellicle upon the iron. I think its detachment is referable to the constant and active operation of the acid in the hot liquor, removing the copper as fast as it is deposited. Hydrogen gas, which I collected in tumblers and burned, is evolved during the solution of the metallic iron in the acid liquor. When the liquor is first heated it becomes turbid with some earthy material, probably alumine.

After the liquor has been sufficiently evaporated it is drawn off into cisterns to crystallize. Branches of trees are put into them as a nucleus for the crystals. When the crystallization has proceeded as far as it will go, the remaining fluid is drawn off, and returned to the evaporating vessels. The cistern remains lined several inches in thickness with crystals, like a geode. The branches have a fine crop

of foliage and fruit, composed of beautiful green crystals. The crystals are very large and perfect, presenting numerous brilliant facets which are often several inches broad. I obtained some which were perfect four sided prisms with a rhombic base six inches in length and half an inch broad.

Every thing about this mineral manufactory is curiously reddened with iron rust. When a dry day succeeds a rain or a shower, the whole mine becomes covered with a white crystalline efflorescence like a hoar frost, and the rain water which runs down into the cavities of the mine becomes so strong a solution as to crystallize. Wherever the solution dribbles from the rocks, or leaks from the cisterns, large stalactites are formed so precisely like icicles that they would not be distinguished from them were it not for their green colour. These stalactites are very numerous at some seasons and present a very beautiful spectacle.

An ingenious method has been contrived to catch the wash of the whole mine. There has been cut in the compact ore, quite across the lower edge of the mine, a channel, into which, by its inclination, the mine discharges the wash of every shower, together with the natural oozing from the hill above. A trough conveys the fluid from the channel to the boilers. To increase the effect of this natural brook of copperas, the ore has been broken into large fragments, and heaped along the upper side of the channel, there to undergo a slow decomposition precisely as it does upon the scaffolds mentioned above.

The mine, where it has not been opened is covered with oxide of iron, which consists principally of incrustations of vegetables.

In the part where I examined these incrustations, they are about three feet deep. The vegetables seem to have been enveloped by a thin uniform crust, but having decayed and disappeared the crust remains an empty mould or pattern of the vegetable. The general figure of the vegetable is pretty well preserved in the external form of incrustation; but the internal cavity is wonderfully perfect, the sinuosities

of the bark, the veins of the leaves and the striæ of the buds are preserved to microscopic minuteness. The impressions are so perfect that it is difficult for one to convince himself that the real vegetable is not there. All the vegetables that we should expect to find upon a given spot of ground, in the woods, seem to occur there. I could, in general, recognize the species, and even the varieties. Among the specimens I obtained, were the following: hemlock branches and cones; nuts, burrs, and leaves of the beech; hazel nuts and species of golden rod which I recognized by a peculiar swelling, often produced upon this plant by an insect. I could not ascertain that any animals had ever been found incrustated. The incrustations are divided into several strata, by layers of oxide, which have a structure so compact as to present a fracture almost or quite vitreous.

The superintendant told me that four men manufactured one hundred tons of copperas in a year, besides carrying on the business of a small farm.

A small quantity of the ore has been found which had undergone a spontaneous decomposition and was thought to be very rich. The superintendant told me, that a barrel of it afforded three hundred and thirty-three pounds of copperas. When I considered the quantity of iron the liquor dissolves, and the water it acquires in crystallization, this statement seemed less incredible than at first.

I have deposited specimens of the gangue of the ore in its various conditions, the crystals, &c. in the New England Museum, Boston.

**ART. X.—*On the Action of Acids upon Salicine.* By
*Peschier, Pharmaceutist at Geneva.***

[From the *Journal de Chimie et de Toxicologie.*]

Salicine having been acknowledged a crystallizable neutral substance, we had reason to believe that its chemical properties would be confined to this character; but experience has proved to the contrary.

Having been informed by Mr Calloud of Anneci that concentrated sulphuric acid, poured upon salicine, imparted to it a very lively red colour, I wished to ascertain how nitric acid would act upon it, and I was not a little surprised at the result. Immersed in this acid, salicine was soon dissolved and, in the course of about two hours, the liquid concentrated in a porous, yellowish white mass, which, during the night, acquired the form of a mushroom, with edges curled up by scales, placed one over the other, from bottom to top, and furnished with acicular crystals. This mushroom, left exposed to the air, acquires sometimes, in the course of a few days, a pinkish hue, which passes gradually to a lively red. However varied may the quantities of acid be, the results are invariably the same.

Suspecting that these products could not take place without a real combination, I dissolved in water, one of those that contained the smallest proportion of acid. The solution having no action on litmus, I could not otherwise account for it, but that the proportions of the ultimate principles of salicine had undergone a conspicuous change, and that this solution had probably past the alkaline state.

This interesting question induced me to study the action of the different acids upon salicine, and the following are the most striking results I obtained from my experiments.

As soon as salicine is covered with sulphuric acid, it acquires a very lively red colour, which passes to claret, and even to a dirty pink, if there is an excess of acid. Sulphuric acid, diluted with five or six times its weight of water,

does not change the colour of salicine, but it combines with it as it does with the concentrated acid. If, after diluting both these liquids with water, the excess of acid be saturated with the carbonates of soda or potassa, and the liquors be evaporated to the consistence of a syrup, and then treated with alcohol, the sulphate of salicine is dissolved, and the alcoholic solution yields, by evaporation, a salt crystallized in silky prisms diverging from the centre to the circumference, in the process with concentrated acid; and forming a prismatic vegetation climbing to the sides of the vessels in that with diluted acid. These products have a very bitter taste; the former is of a brownish colour and the latter white.

The solution of supernitrate of salicine is yellowish, and possesses the peculiar taste of saffron, united with the bitterness of salicine. Treated in the same way as the super-sulphate, it yields colourless crystalline tufts, resting upon a yellowish sediment of the same nature.

Salicine is dissolved by hydrochloric acid, without alteration in its colour, and the solution, submitted to spontaneous evaporation, affords, on the sides of the liquid, small white masses, resembling, as long as they are moist, congealed grease; but exhibiting, when dry, a crystalline appearance.

The phosphoric acid, obtained from the action of nitric acid upon phosphorus, affords prismatic crystals, some with striated faces, others with smooth faces, whilst some may be distinguished among the rest, with two wide and two narrow faces.

Acetic acid yields a salt, forming a handsome vegetation.

From the characteristic form of these salts when carried to the state of perfect neutralization, I had every reason to believe that salicine was converted into an alkaline base, and, in order to ascertain this point, I proceeded to the decomposition of the sulphate of salicine by solution of baryta. After separating the sulphate of baryta thrown down, and ascertaining the absence of this earth in the liquid, I obtained a solution, which brought to the blue colour the reddened

litmus paper, and yielded prismatic crystals, together with small white masses, differing in their forms from those of salicine, and possessing an intensely bitter taste, without, however, partaking of the willow smell that the latter retains.

In order to ascertain with greater precision the total absence of baryta in this product, I evaporated to dryness the mother water, incinerated the matter obtained, and employed all the usual tests for this earth, without discovering the smallest trace of it. Considering that the crystals I had obtained differed, in some very essential points, from the salicine employed in the formation of the sulphate, and that the latter had, altogether or partially, acquired the alkaline properties, I cannot but look upon these facts as evident proofs of the action of sulphuric acid upon salicine.

By decomposing the nitrate of salicine by the carbonates of potassa or ammonia, and separating the soluble nitrate by means of alcohol (permitting the carbonate of ammonia slightly to predominate in the liquid, until evaporated to the point of crystallization), I obtained a liquor of a deep saffron colour, possessing the strong taste of this article, without any alkaline savour; but which, judging from the papillary form of the crystals afforded by it, and from a sort of detonation that took place on their being thrown upon live coals, was nothing else but a nitrate of salicine, whose base had undergone a certain point of decomposition; but the separation of which from the acid had not been affected by the means resorted to.

As to the degree of capacity for saturation that salicine possesses, it is obvious that it is very small, and, probably, that there is but an inconsiderable portion of that substance, treated with acids, that passes to the alkaline state, for it acts on the test paper only when the liquid has acquired a certain degree of concentration. I acknowledge that I would be the first to consider as absurd the possibility of converting salicine into an alkali by the action of sulphuric acid, diluted with five or six times its weight of water, or by that of hydrochloric or phosphoric acids, without the as-

sistance of heat, were it not for changes of a similar nature which take place in the acidification of sugar and gum, and in the conversion of starch into sugar by the action of nitric and sulphuric acids. Consequently the want of experience is, in this instance, the only impediment that can be urged against admitting as a truth the change which has really taken place, for piperine is almost the only substance that has some analogy with salicine, and yet in the supposition that its character would not be altered by the action of acids, what just inferences could be drawn from that circumstance? I know but one mode of deciding this question, that is by a comparative analysis of the ultimate principles of the salicine employed in the experiment, with that of the portion which has been converted into an alkali; but as my occupations do not permit me to undertake the task, I shall see with great pleasure those of my colleagues, who are acquainted with this kind of questions, institute experiments upon it.

E. D.

REVIEW.

The Pharmacopœia of the United States of America. By authority of the National Medical Convention held at Washington 1830. Philadelphia, 1831.

The convention, which framed the National Pharmacopœia of 1820, arranged a plan for the election of another to meet in Washington in 1830, for the purpose of revising the work. By this plan the Union was divided into four sections, each of which was entitled to send three delegates to the convention. The president was required to issue writs of election to the several incorporated medical societies in these respective sections, requiring them to ballot for the three delegates. The several institutions were requested to forward to the president, on or before a certain day, "*the names of three persons, thus designated by ballot*"; and the president of the convention is hereby requested on the said day to *assort and count the said votes*, and to notify the three persons who shall have the greatest number of votes of their election," &c. The ambiguity of this provision was the cause of serious difficulty. The societies, in the first part of the sentence, are required to send the *names* of the delegates chosen by them, and it appears to have been the impression in many places, that the delegates thus chosen were to proceed to Washington. The convention however was to consist of but one set of delegates from each section, and the intention was, that the state of the ballot, and not merely its result, was to be sent for examination to the president; and

he was to determine who was elected. It is obvious that, unless a general medical convention be held in each district, for the purpose of choosing delegates, this plan must fail entirely of its design. It might happen that one of the most respectable medical bodies in a district, deeply sensible of the importance of the object in view, and knowing the impossibility of making the revision in a day or a week, had selected a committee of its most competent and accomplished members, to undertake a thorough experimental examination of the subject, devoting to it many months; and that it should afterwards elect these men, thus fitted for the duty, as its delegates, in the full confidence that its voice would be heard in the convention. It might happen after all this preparation, that a more numerous, or more ambitious society in another part of the district should outvote it, and elect a set of deputies unprepared in many respects for the office. It *did* happen accordingly. When the president counted the ballot which had been sent him, he found that three delegates were chosen for the eastern district, consisting of the states east of New York. One of these resided in Boston, one in New Haven, and the other in Berkshire, Mass. For the middle district consisting of the states of New York, New Jersey, Pennsylvania, Maryland, and Delaware, a district in which are situated the three great medical schools of the Union, only one return of *the state of the ballot* was made to him, although the Philadelphia College of Physicians notified him of the *election* of its delegates. The three delegates, declared by him to be chosen from this district, resided, one in Albany, and the other two in New York! From the southern and western districts no returns were made.

The delegates thus appointed, not caring to encounter the fatigues of a journey to Washington, determined to meet in New York on the appointed day. Three, or at most four, of their number met, and finding their body too small to undertake the business, adjourned for six months, and agreed to invite the attendance of delegates from the medical societies throughout the country. The convention, consisting of

ten physicians, was accordingly held, and the product of their joint industry and collected knowledge is before the world. In the mean time delegates elected by the medical societies of New Jersey and Delaware, the Philadelphia College of Physicians, the Medico-Chirurgical faculty of Maryland, and the Medical College of Washington, met at this latter city. They invited the attendance of the Surgeon-General of the Army, the senior Naval Surgeon and those members of Congress who were practitioners of medicine. The convention, thus organized, consisted of thirteen physicians. Delegates had been appointed by the medical society of Louisiana, but were detained upon their passage, so that they did not arrive until the convention had adjourned.

The following account of the proceedings of the delegates, and the measures taken by them to secure the proper revision of the work, is too interesting to be omitted or abridged.

"On the fourth of January 1830, the Convention assembled at Washington, the following delegates being present—Lewis Conduct, M.D. and Isaac Pierson, M.D. from the Medical Society of New Jersey; Geo. B. Wood, M.D. and Franklin Bache, M.D. from the Philadelphia College of Physicians; John L. Morris, M.D. from the Medical Society of Delaware; James H. Miller, M.D. from the Medico-Chirurgical Faculty of Maryland; and N. W. Worthington, M.D. and Thomas Henderson, M.D. from the Medical College of Washington. The Convention was organized by the appointment of Dr Conduct, President, and Dr Henderson, Secretary. As many parts of the United States were not represented, it was resolved, in order as far as possible to supply the deficiency, and to give the various medical interests of the country their due weight, that the Surgeon General of the Army, the Senior Surgeon of the Navy stationed at Washington, and those members of Congress who were practitioners of medicine, should be invited to participate in the proceedings. In compliance with this invitation, the following gentlemen took their seats in the Convention—Joseph Lovell, M.D., Surgeon General; Bailey Washington, M.D.,

Senior Naval Surgeon, stationed at Washington; and Nathan Gaither, M.D. of Kentucky, G. E. Mitchell, M.D. of Maryland, and Samuel Swan, M.D. of New Jersey, members of Congress.

"After the organization of the Convention, its meetings were held in the Capitol; and among the earliest proceedings was the appointment of a Committee to examine and revise the Pharmacopœia, with directions to submit the revised copy at a future meeting. The following report was presented by this Committee.

"The Committee, appointed on the revision of the Pharmacopœia of the United States, beg leave to report, that they have examined a revised draught submitted to them by the delegates from Pennsylvania, with as much attention as their limited time would permit, and recommend it to the Convention as the basis of a new edition of that work. As, however, it contains several important modifications, which require a more particular examination than your Committee can possibly give them, they recommend that it be referred to a Committee of Revision, to be appointed from the different sections of the country; that the chairman of said Committee be requested to open a correspondence with the several members, for the purpose of submitting the aforesaid draught to their examination, and of obtaining their remarks and observations thereon; that he be authorized and instructed to call a meeting of said Committee at as early a period as practicable, to assemble in the city of Philadelphia, and that any three members shall constitute a quorum for the transaction of business; who, after a careful examination of the several communications that may be submitted to them, shall prepare for the press a revised edition of the Pharmacopœia, and make the necessary arrangements for its publication.

"This report was adopted; and it was resolved that the contemplated Committee should consist of a chairman, and of two members from each of the following cities; viz. Boston, New York, Philadelphia, Baltimore, Washington, Charles-

ton, Lexington and Cincinnati. The gentlemen appointed on the Committee were Thos. T. Hewson, M.D. chairman ; Jacob Bigelow, M.D. and John W. Webster, M.D. for Boston ; Alexander H. Stevens, M.D. and John Watts, M.D. for New York ; Geo. B. Wood, M.D. and Franklin Bache, M.D. for Philadelphia ; Samuel Baker, M.D. and Elisha De Butts, M.D. for Baltimore ; Thomas Henderson, M.D. and N. W. Worthington, M.D. for Washington ; John R. Trescott, M.D. and James Moultrie, M.D. for Charleston ; W. H. Richardson, M.D. and B. W. Dudley, M.D. for Lexington ; and John Morehead, M.D. and Charles E. Pierson, M.D. for Cincinnati.

"The subject which next engaged particular attention was the mode of assembling the Convention of 1840 ; and the following regulations were adopted as those most likely to secure a full representation.

"1. That the president of this Convention shall, on the first day of January 1839, issue a notice, requesting the different incorporated State Medical Societies, the incorporated Medical Colleges, and the incorporated Colleges of Physicians and Surgeons, throughout the United States, to elect a number of delegates, not exceeding three, to attend a General Convention to be held at Washington on the first Monday in January 1840.

"2. That the several incorporated bodies thus addressed be further requested by the president, to submit the Pharmacopœia to a careful revision, and to transmit the result of their labours, through their delegates, or through any other channel, to the next Convention.

"3. That the several medical bodies be further requested to transmit to the President of this Convention, the names and residence of their respective delegates, so soon as they shall have been appointed ; a list of whom shall be published under his authority, for the information of the medical public, in the newspapers and medical journals, in the month of October 1839.

"Considering it necessary to provide against any contin-

gency which might prevent the president from performing the duties thus assigned him, the Convention resolved that in the event of his death, resignation, or inability to act, his duties should devolve upon the secretary, and, should the latter be prevented from serving, upon an assistant secretary to be appointed for the purpose. N. W. Worthington, M.D. was accordingly chosen assistant secretary.

“Before its adjournment the Convention also provided for the preservation of the records by adopting the following resolutions :—‘First, that the secretary take charge of, and preserve the existing records, until his successor shall be appointed by the Convention of 1840, when it shall be his duty to hand them over to such successor ; secondly, that in case of the death, resignation, or inability to act of the Secretary, his duties shall devolve upon the Assistant Secretary ; and thirdly, that it be recommended to future Conventions to appoint their secretary or secretaries from members residing in the District of Columbia.’

“After the adjournment of the Convention, delegates from the Medical Society of Louisiana arrived at Washington, having been unexpectedly detained upon their passage ; and Edward H. Barton, M.D., one of the delegates, after inspecting the draught adopted as the basis of the revised edition, gave it his full approval.

“The chairman of the Committee of Revision, having received due notice of his appointment, immediately addressed letters to the several members of the Committee, not originally members of the Convention, informing them of their nomination, and of the duties they were requested to perform. Answers to these letters were received from Boston, Baltimore, Charleston, Lexington and Cincinnati, conveying on the part of the writers, in most instances, either an expression of their confidence in the merits of the work, or promises of co-operation in the revision. Manuscript copies of the draught adopted by the Convention were transmitted to Boston, Washington, and Lexington, for the examination of the several members who had expressed a willingness to

participate in the labours of the Committee ; and notice was subsequently sent to them, indicating the eleventh of October 1830 as the day of meeting.

" On the day appointed, the Committee met in the hall of the College of Physicians at Philadelphia. The members present at the first meeting were Thomas T. Hewson, M.D. Chairman ; Thomas Henderson, M.D. of Washington ; and George B. Wood, M.D. and Franklin Bache, M.D. of Philadelphia. On the following day Jacob De La Motta, M.D. of Charleston, appointed by the Medical Society of South Carolina in the place of Dr Moultrie, who had declined, took his seat in the Committee. As the objects of the revision could be accomplished with nearly the same facility by contributions from a distance as by the presence of the members, it was foreseen that, in most instances, this mode of co-operation would be preferred ; and the Convention, to provide against any difficulty which might arise from this circumstance, had determined that three should constitute a quorum.

" The Committee having been duly organized, proceeded to the revision of the work, in which they were assisted by written communications from Drs Bigelow, Webster, and Worthington, absent members, suggesting alterations or additions, many of which, after due consideration, were adopted.* The amendment of the draught having been accomplished, a Committee was appointed, consisting of Drs Hewson, Wood, and Bache, with power to make the necessary arrangements for its publication, and to adopt any modifications, not inconsistent with its general plan and scope, which might be suggested by their own further examination, or by communications which might still be received from others.

" In accordance with the powers granted them, the committee of publication submitted the amended draught to the examination of the Philadelphia College of Pharmacy, by

* After the adjournment of the committee, a communication was received from Dr Dudley, of Lexington, expressing his approval of the draught.

whom, after a careful review by a committee appointed for the purpose, a resolution was adopted, approving the work, and recommending the members of the college 'to use the formulæ thereof in their pharmaceutical preparations.' It is proper to add, that many valuable practical suggestions were received from the Committee of the College, of which advantage has been taken in the final arrangement of the work."

We do not think it worth while to enter here upon the discussion of the *legitimacy* of the two conventions. It is obvious that there was a misunderstanding respecting the arrangements made by the convention of 1820 for the election of that of 1830, and it is also obvious that the claim of the convention which met in New York, on the score of the regularity of its election, must be vitiated by its own proceedings, and the place of its meeting. The convention which met at Washington was legitimate as to the place of assembling, but irregular as to the manner of its election.

We care but little about the matter, and it will not require an extraordinary degree of superiority in either to determine the public voice in its favour.

The convention of 1830 has judiciously taken the Pharmacopœia of 1820 as its model, altering nothing without a reason for so doing, and considering it as sufficient authority for the general arrangement and plan pursued. It has confined its labours to correcting the errors, pruning the redundancies, and supplying the deficiencies of the original work; and the success with which all this has been done, the close scrutiny, the exact learning, and extensive research displayed in the labour, will fully vindicate the reputation of our country in this department of science.

It necessarily happens that the improvements made from time to time in such a work as the Pharmacopœia have an air of minute criticism. This is especially the case with the present revision, in which the alterations are scattered over the volume with a liberal hand, yet are of such a character

that a careless reader would not observe the twentieth part of them.

We open the book at random at the fourth and fifth pages, and will go through the articles enumerated therein in order to give our readers an idea of the manner in which the revision has been made.

Acidum Sulphuricum.

The old Pharmacopœia says,

ACIDUM SULPHURICUM.

Sulphuric acid.

Acidum sulphuricum.

The specific gravity to that of water as 1.850 to 1.

The present one has it,

ACIDUM SULPHURICUM.

Sulphuric acid.

Acidum sulphuricum, cujus pondus specificum est 1.8485.

Sulphuric acid of the specific gravity of 1.8485.

Here not only is the specific gravity corrected, but the description is given in Latin as well as in English, and the words "to that of water as—to 1," omitted as unnecessary, and therefore inelegant.

Acidum tartaricum.—This useful, and now much used acid is added to the materia medica. It is never prepared by the apothecary in small quantities, and therefore properly belongs here, and not to the "Præparata."

Aconitum.—No alteration.

Adeps.—In the old Pharmacopœia this is merely called adeps. It is here, with more precision, defined to be *adeps curata*.

Alcohol.—In the old Pharmacopœia the synonyme is "*alcohol*." The specific gravity to that of water as 835 to 1000. The latter phrase is altered as in the case of sulphuric acid, and the definition given is, *spiritus rectificatus*.

Allium.—The old Pharmacopœia says the part used is the root. The late convention define it with botanical precision to be *bulbus*, the bulb.

Aloe.—The convention has given the *aloe spicata* as the plant yielding aloes. We presume they mean to designate

the *cape aloes* as the officinal species, that being almost the only kind brought to this country. The former convention followed the London college in giving the Socotorine and Barbadoes aloes, and referring the former to the *A. spicata* and the latter to the *A. vulgaris*. In the uncertainty which exists as to the origin of the different species of this drug, no arrangement can be regarded as permanent.

Alumen.—The old Pharmacopœia defined this salt to be super-sulphas aluminæ et potassæ; the present one calls it aluminæ et potassæ sulphas, which is the correct nomenclature.

Ammoniacum.—The old convention defines this to be a *gum resin*; in the work before us it is simply called *succus concretus*. We have our doubts whether this be an improvement. The English name in the latter is *ammoniac*, in the former it is *ammoniacum*. A recent traveller has discovered, it is said, that both gum ammoniæ and galbanum have been referred erroneously to the plants which are here supposed to furnish them.

Ammonia murias.—The old Pharmacopœia translates this “muriate of ammonia *called* sal ammoniac.” In the present edition the word *called* is omitted as awkward and unnecessary. In the former, the name is repeated in the second column; while in the latter the name is given but once. This remark applies to all the chemical preparations enumerated in the *Materia Medica*.

Amygdala.—This word is translated *almond* in the old Pharmacopœia, *almonds* in the present. Conformably with the practice of ancient Latin authors, the convention has given the names of all articles in the singular number, and has translated them into the plural where our own idiom requires it, as in the present instance. The student, who will compare the two books throughout, will find very numerous corrections of this class.

Angustura.—This bark is referred to *Galipea officinalis* on the authority of Dr Hancock. *Bonplandia trifoliata* is retained as a synonyme.

Anisum, Anthemis, Antimonii Sulphuretum, Argentum.

—No alteration.

Aqua.—The apothecary is not restricted to the use of *aqua fontana* as in the last; but is left at liberty to use any sort of clear water for the purpose of distillation; to which operation all the water used in compounding ought to be submitted.

Armoracia.—The old Pharmacopœia directed the *whole plant* to be used. The present one more accurately points out the *fresh root* as the officinal part of the plant.

In looking over the *Materia Medica*, we perceive many improvements on the old Pharmacopœia. The botanical references are made on the authority of the best authors, and many new articles are introduced to notice, such as Iodine, Lupuline, Hemlock pitch, Rhatany root, the Pith of Sassafras, and Taraxacum.

The definitions also, where they are altered, are generally given with more accuracy. Elaterium, for example, instead of being called “*extractum fructus*,” is said to be “*materia fructus succo demissa*.” The “fruit” of the “*Cassia fistula*” is ordered to be kept, and not the “pulp of the fruit,” as formerly; and the Colocynth is directed to be “the fruit deprived of its rind” and not “the fruit deprived of its rind and seeds.” This is done, we suppose, in order to conform to circumstances, as it is the pod of the cassia and the pared melon of the colocynth that are always kept in the shops.

We are glad to find that use has been made of the latest authorities, in referring Senna to the *Cassia acutifolia*, *obovata* and *elongata*, the three species from which it is indiscriminately obtained; in designating the plants which yield the Kino, Myrrh, and Colombo root; and in assigning their proper places in the botanical systems, to various drugs, such as Ipecacuanha, Cardamom, Jalap, Iceland moss, and others.

The botanist will not agree with the convention in calling Lupuline *strobilorum pollen*; nor do we think there will be found many good English *ears* to whom *guaiac* will seem as good an English word as *guaiacum*.

The convention having formed the chemical nomenclature upon the strict principles of the science, ought, we think, to have called Borax *Sodæ bi-boras*; it is said to be *sodæ boras*, and in the old Pharmacopœia is called *sodæ sub-boras*.

It is under the head of "Præparata," that the convention has made the greatest improvements on the old Pharmacopœia. It has rejected many old and unskilful formulæ, has introduced nearly all the new preparations that have been brought into use within the last ten years, and given to the whole of this department a symmetry and precision which entitle the work to a high rank among the best Pharmacopœias extant. In our last number we had occasion to notice the leading defects of the old Pharmacopœia, and it will therefore be unnecessary to say more in relation to them, than that very few appear to have escaped the attention of the convention.

Among the unnecessary and injudicious formulæ expunged from the present revision, are the Black Drop, the place of which is supplied by Dr Hartshorne's acetic tincture of opium; purified Vinegar, the formula for which was an entire failure; five preparations of Antimony; the whole section of Collyria, and many recipes for pills, infusions and decoctions of trifling importance. The space which these occupied is now filled with preparations of more value and importance to the physician, such as the new Alkalies and their salts, and Iodine and its preparations.

As a general standard for the composition of those medicines in which the experience and judgment of the physician must govern the proportions of the active principle, and the choice of adjuncts, the London Pharmacopœia has been followed. In the formulæ which may be calculated upon strict chemical principles, and in those where such properties are involved as the solubility of an active ingredient, the consistence of an ointment, &c. the convention has inserted nothing that was before doubtful, without a full and decisive experiment.

We will examine the first two heads of *Aceta* and *Acida* as an illustration of the manner in which the revision has been made. In doing this we shall make our extracts from the Latin text, in order to compare the latinity of the two works. The *Pharmacopœia* of 1820 was chiefly compiled from those of the three British colleges. Whatever formula was adopted, the language in which it was expressed was also copied, so that the work partook of the inequality of style which marked the three *Pharmacopœias* from which it was compiled. The text of that of London is, however, very far superior in purity of style to the others, and is well known to have been from the pen of the celebrated Dr Thomas Young, one of the most accomplished scholars of the age. The late convention therefore adopted it as their model, and they have successfully laboured in executing this part of their duty; for the style of the Latin text, and we speak the opinion of competent judges who have carefully examined it, is correct and chaste, and a good model for the physicians of our country. We are disposed to attach much importance to this circumstance, as a recommendation of the *Pharmacopœia* to general adoption. The Latin is the universal language of the profession; and it is unhappily too little studied and understood by the majority of American physicians. A critical knowledge of it is indispensable to all who wish to become learned in their profession, and to those who are ambitious of making themselves known to the literary republic of Europe.

A pure and classical Latin *Pharmacopœia*, which shall accustom our physicians to the correct diction of their science, we therefore conceive to be an object of national importance.

To proceed with our examination;—the first article of the preparations is

ACETUM DESTILLATUM.

R. *Aceti* congiūm.

Destillet acetum, balneo arenæ, ex retortâ vitreâ in excipulum vitreum. Octario primo rejecto, octarios quinque proximè destillatos serva.

The formula of 1820 stands thus,

ACETUM DISTILLATUM.

R. Aceti octantes octo.

Distillant in vasis vitreis aquæ balneo. Octante primo stillato rejecto, octantes sex proximos serva.

The superior elegance and correctness of expression of the first must be obvious to the tyro in Latin.

The old convention *attempted to improve* both the formula and the latin of the London college. The late convention copied its language and improved its directions. The London throws away the first pint and directs the next six pints to be preserved; ours, more judiciously preserves only the next five pints, thereby avoiding the empyreuma which always taints the last portions that come over. The old American pharmacopœia directs the distillation to be performed in a water bath, the heat of which is scarcely sufficient for the effectual distillation of the acid.

The black drop is omitted and the Acetum Colchici introduced. The recipe for this is somewhat altered from that of the London College, which directs the use of the recent bulb. Being dependent upon the dried bulb for all our preparations of colchicum, the convention has directed it to be used in the same proportions as the London formula. It is much to be wished that careful experiments were instituted to determine the real and comparative value of recent and dry colchicum. The opinions respecting them are so various, and the vinum colchici, is so uncertain a preparation, as ordinarily made; that one of the most powerful and efficient remedies in the materia medica, which it really is, is in danger of being regarded as unworthy of confidence. With respect to the acetum colchici and the syrup which is prepared from it, we doubt whether either have been much used in this country, nor have we ourselves had any experience of their efficacy. But the *wine* of colchicum has acquired a considerable reputation, which, when care is taken to form a saturated solution, it seldom fails to support. We

do not find fault with the proportions here used in making the vinegar ; our design in these observations is to vindicate the convention from the charge of want of skill in its formula for the *Vinum colchici*, which is ordered to be made with half a pound of the bulb to a pint of wine. It is, perhaps, a waste of the colchicum, but it makes an uniformly good preparation ; which, in the case of so violent a remedy as the colchicum, it is of the utmost importance to secure.

The progress of improvement is slow, and confidence in new and powerful remedies often grows out of a mere accident. We well remember that a few ounces of sulphate of quinia remained unsold and unnoticed for more than a year in the shop of one of our most eminent apothecaries, until a citizen of some distinction was cured by it of an intermittent fever. He published a statement of the fact, which attracted great attention on account of the epidemic that then prevailed ; and from this circumstance the fortunate individual of whom he purchased it sold many thousand dollars' worth of the new medicine. The active principle of the colchicum is kept in all our principal shops ; it is uniform in its qualities, unalterable by age, and its strength can be relied on with the greatest certainty. Are we to wait till some fortunate accident such as we have related shall dispel the fears entertained respecting it, and induce our physicians to substitute *Veratria*, an uniformly active medicine, for one liable to such changes as the colchicum ?

The *Acetum Scillæ* of the old work is taken from the Edinburgh ; that of the revised code is a copy of the London and Dublin recipe, excepting that the quantity of alcohol is lessened to correspond with that ordered by the London College in the *acetum colchici*. We think both alterations judicious ; the proportion of squill is that in common use, and with respect to the alcohol the less that will answer the better. The time of maceration is also changed from one to seven days.

The following is the recipe for acetic acid.

ACIDUM ACETICUM.

R. Sodæ acetatis in pulverem triti libram :

Acidi Sulphurici libram dimidiam.

Acidum sulphuricum retortæ vitreæ infunde, eique sodæ acetatem paulatim adde; dein balneo arenæ, igne modico, acidum aceticum destillet, donec residuum siccum fiat. Hujus acidi pondus specificum est 1.0634.

This formula is undoubtedly a very good one; we wish the convention had stated, in addition to the specific gravity of the acid, the quantity of carbonate of lime which it will dissolve; for it is peculiar to this acid that the same specific gravity is indicated by an acid of double the strength of the above preparation. This pure and concentrated glacial acid may be obtained by driving off the water of crystallization from the acetate of soda previous to distillation. An article of the strength of the above is made by the English chemists, and labelled Concentrated pyroligneous acid No. 11.

Dilute acetic acid of the strength of good vinegar is made by diluting the above with ten parts of water.

Both the above preparations are newly introduced.

The directions for making Benzoic acid are those of the London College; which are neater than those of the Dublin, that were copied in the old Pharmacopœia.

The convention terms the Prussic acid of the old Pharmacopœia, Hydrocyanic acid, and adopts the mode of preparation contrived by Vauquelin; the old formula was that of Scheele, which is by no means uniform in its results. The method of Vauquelin is the most simple, and has the sanction of the Paris Codex in its favour. The apothecary who prepares it must take care to test the acid for any undecomposed cyanide of mercury, which may remain, and to subject the solution to the action of a *plentiful* stream of Hydrosulphuric acid.

The convention has introduced the common Elixir of vitriol under the name of Aromatic Sulphuric Acid, instead of Tincture of sulphuric acid, by which the former convention designated it. The recipe and the title are both taken from the Edinburgh Pharmacopœia, and we think the original

name decidedly preferable. The Edinburgh College directed it to be made with two pounds of alcohol, and half a pound of acid; or one part in four; the old convention, changing pounds into measures, directed two pints of alcohol, and three fluid ounces of acid, or one part to about 4.8; the late convention, retaining the fluid ounces and desirous of returning to the strength of the original recipe, have ordered, three and a half fluid ounces of the acid, which is one part to about 4.15. We confess we should prefer going back altogether to the original receipt, of which the aliquot proportions are a strong recommendation.

In the old Pharmacopœia no uniform arrangement of the written formulæ was adopted. In the recipe for elixir of vitriol for example, the acid and the alcohol are first directed; the apothecary is told to digest them together; then follow the names and quantities of the aromatics used, and the direction for proceeding with them. The "*Mel Scillæ compositum*" is another example of this mode of prescribing, for the tartar emetic which it contains is mentioned in the directions for the mode of preparation, and may easily escape the attention of the physician. The late convention has returned to the mode of prescribing adopted in the best models abroad; namely, of reciting the names and quantities of every article in the compound, and then writing underneath the manner of mixing them.

Dilute sulphuric acid is altered back to the London standard. The old convention intended to adopt the Edinburgh formula, but altered the weights as usual to fluid ounces without making the requisite allowance for specific gravity. It thus made a diluted acid of twice the strength of any of the British formulæ.

We might readily go through the whole work in this manner, and there is scarcely a section of it which does not furnish matter for equally copious criticism. What we have said is, however, sufficient to indicate the thorough manner in which the revision has been made, and we must confine

ourselves to remarks of a more desultory and general character.

The omission of the old convention to rectify its sulphuric ether is here corrected.

A formula for preparing Spirit of Nitrous Ether, which has long been in use among manufacturing chemists, and adopted in the Pharmacopœias of Germany, is introduced. It is a far better and safer process than the old one, which it must entirely supersede.

The formula for Aqua ammoniæ is that of the Edinburgh College, the gas being distilled over and washed previous to its absorption, thus securing the absolute purity of the solution. The old process was that of the London College which put all the water into the retort, and distilled over a certain quantity. It is scarcely possible by this mode to obtain a solution free from muriate of ammonia. The specific gravity of the product is stated to be .944, which is equivalent to 14.5 per cent of alkali. This is stronger than the liquor ammoniæ of the London College, which contains about 9.6 per cent of alkali, although weaker than that of the other colleges which contains nearly 16 per cent. It will be found upon examination that the process is also more economical; that in the process here adopted 23 per cent only of the ammonia contained in the muriate is lost, while in that of the Dublin the loss is 42 per cent, and in that of the London College, 54 per cent.

The Hydrósulphuret of Ammonia is prepared with gas, procured by the action of dilute sulphuric acid on sulphuret of iron.

The solution of Carbonate of ammonia of the old Pharmacopœia was an unskilful preparation; we are glad to find that it no longer encumbers the work.

The Dublin process for Tartar Emetic is given in place of that of Philips, which was adopted by the old convention.

Antimonial wine is made with two grains to the ounce, in order, to agree with the recipe of the London and Dublin Colleges.

We copy the recipe for *Aqua Cinnamomi*, as an example of the improved mode of saturating water with essential oils.

R. Olei Cinnamomi fluidrachmam dimidiam ;

Magnesiæ drachmam dimidiam ;

Aquæ Destillatæ octarios duos.

Oleum Cinnamomi primùm cum Magnesiâ tere, deinde cum aquâ paulatim instillatâ, et per chartam cola.

The Confection of Opium is restored to its place in the Pharmacopœia ; the confection of red roses is made with the Rosa Gallica, and the confection of orange peel with the peel grated, and not entire.

Under the head of Emplastra, we are glad to see the Emplastrum Galbani compositum restored to its place ; and wish the same care had been extended to Emplastrum Thuris, which is an excellent adhesive composition. We notice several improvements in the preparations of Iron, such as the introduction of the sulphuret and sulphate, the omission of several obsolete preparations, and the correction in the proportions used for making the phosphate, and the tincture of the muriate.

The preparations of Mercury have undergone but little change, except in the nomenclature, which is made to correspond with the present state of science. The formula of the last edition of the London Pharmacopœia is adopted for Calomel ; being a shorter process than that of the former edition, although founded on the same principles. We recommend for practice, the mode of preparing Cyanuret of mercury, recently contrived in Europe. It consists in decomposing the Ferro-cyanate of Potassa by sulphuric acid, and passing the disengaged gas through water, in which finely powdered red oxide of mercury is suspended. It is more economical and neater than the process of the Pharmacopœia, and equally certain in its result.

The following formulæ are either new, or so much improved as to be greatly increased in value.

LINIMENTUM SAPONIS CAMPHORATUM.

R. Saponis Vulgaris uncias tres;
Camphoræ unciam;
Olei Rosmarini,
Olei Origani, singulorum, fluidrachmam;
Alcoholis octarium.

Camphoram cum Oleis in Alcohole liqua; dein Saponem adjice, et digere, balneo arenæ, donec liquetur. Hoc Linimentum frigidum spissitatem habet unguenti mollis.

MORPHIA.

R. Opii concisi libram;
Aque Destillatæ octarios sex;
Alcoholis congiuntum;
Aque Ammoniæ fluiduncias sex.

Opium macera cum Aquæ Destillatæ octariis quatuor, in vase vitreo, per dies sex, sæpius agitando; dein per chartam cola. Residuum Aquæ reliquæ lava, et cola ut antea. Liquores colatos inter se misce, hisque adjice primum Alcoholis octarios quinque, dein Aquæ Ammoniæ fluiduncias tres, Alcoholis octario dimidio prius immistas. Post horas viginti quatuor infunde quod reliquum est Aquæ Ammoniæ, Alcoholis octario dimidio ut antea immistum; et liquorem seponere per diem unum ut fiant crystalli. Has, ut puræ sint, cum Alcohole reliquo coque donec liquentur, liquoremque adhuc calidum cola, et seponere.

MORPHIÆ SULPHAS.

R. Morphicæ in pulverem tritæ unciam;
Aque Destillatæ octarium dimidium;
Acidi Sulphurici Diluti quantum satis sit.

Morphiam cum Aquâ misce; dein Acidum paulatim instilla, assidue movens, donec Morphia saturetur et liquetur. Liquorem balneo aquoso consume, ita ut dum frigescit fiant crystalli. Has super chartam bibulam exsicca.

LIQUOR MORPHIÆ SULPHATIS.

R. Morphicæ Sulphatis grana octo;
Aque Destillatæ octarium dimidium.
Liqua Morphicæ Sulphatem in Aquâ Destillatâ.

PILULÆ COPAIBÆ.

R. Copaibæ uncias duas;
Magnesiæ recentè paratæ drachmam.
Misce, et seponere donec fiat massa ad pilulas fingendas idonea; deinde in pilulas ducentas divide.

LIQUOR PLUMBI SUBACETATIS.

R. Plumbi Acetatis,
Plumbi Oxidi Semivitrei, singulorum, uncias octo;
Aque Destillatæ octarios duos.
Misce in vase vitreo, et coque per tertiam horæ partem; tum per chartam cola.

POTASSII IODIDUM.**POTASSÆ HYDRIODAS.**

R. Liquoris Potassæ octarios duos;

Iodini quantum satis sit.

Liquori Potassæ, calore leni adhibito, paulatim adjice Iodini quantum satis sit ad Potassam saturandam, coloremque fuscum liquori impertiendum. Deinde Acidum Hydrosulphuricum per liquorem, in vase idoneo, trans mitte, donec color fuscus evanescat, et Acidi Hydrosulphurici odor in liquore permaneat. Tum per chartam cola, et aquâ calidâ-residuo affusâ, iterum cola. Liquorem colatum paulisper coque ut Acidum Hydrosulphuricum vapo ratione separetur; tum sulphur, si quid demissum fuerit, remove, et acidum, si quid adsit, Liquore Potassæ sat-ura. Denique liquorem decoque donec sal exsiccat us fuerit.

Acidum Hydrosulphuricum obtinetur ex Ferri Sulphureto, et Acido Sulphurico quadruplice aquæ pondere diluto.

SYRUPUS ACACIÆ.

R. Acaciæ Gummi uncias quatuor;

Sacchari libram;

Aquæ bullientis octarium.

Liqua Gummi in Aquâ; tum Saccharum adjice, et coque ut fiat syrupus.

SYRUPUS ALLII.

R. Allii recentis concisi uncias duas;

Aceti Destillati octarium;

Sacchari libras duas.

Allium macera in Aceto, in vase vitreo, per quatuor dies; dein exprime, et se-
pone ut fæces subsident; denique in liquore defæcato Saccharum liqua eodem
modo quo de Syrupo præceptum est.

SYRUPUS RHEI AROMATICUS.

R. Rhei contusi uncias duas cum semisse;

Caryophylli contusi,

Cinnamomi contusi, singulorum, unciam dimidiam;

Myristicæ contusæ drachmas duas;

Alcoholis diluti octarios duos;

Syrupi octarios sex.

Rheum et aromatica macera in Alcohole Diluto per dies quatuordecim, et co-
la; dein liquorem, balneo aquoso, consume ad octarium, et adhuc calentem cum
Syrupo calefacto misce.

SYRUPUS SARSAPARILLÆ.

R. Sarsaparillæ contusæ libras duas;

Guaiaci Ligni rasi uncias tres;

Rosæ Gallicæ,

Sennæ,

Glycyrrhizæ contusæ, singulorum, uncias duas;

Olei Sassafras,

Olei Anisi, singulorum, minima quinque ;
Olei Gaultheriæ minima tria ;
Sacchari libras octo ;
Alcoholis Diluti Octarios decem.

Macera Sarsaparillam, Gualaci Lignum, Rosam, Sennam, et Glycyrrhizam in Alcoholis Diluto per dies quatuordecim ; dein exprime, et per chartam cola. Tincturam, balneo aquoso, consume ad octarios quatuor cum semisse ; tum Saccharum adijce, et liqua ut fiat syrupus. Huic frige facto adijce Olea prius cum exiguo syrupi contrita, et misce.

TINCTURA IODINI.

R. Iodini unciam dimidiam ;
Alcoholis octarium dimidium.
Iodinum liqua in Alcoholis.

TINCTURA LUPULINÆ.

R. Lupulinæ uncias quatuor ;
Alcoholis octarios duos.
Macera per dies quatuordecim, et per chartam cola.

TINCTURA OPII ACETATA.

R. Opii uncias duas ;
Aceti fluiduncias duodecim ;
Alcoholis octarium dimidium,
Opium tere cum Aceto ; tum, Alcoholis adjecto, macera per dies quatuordecim, et per chartam cola.

UNGUENTUM HYDRARGYRI NITRATIS.

UNGUENTUM CITRINUM.

R. Hydrargyri Purificati unciam ;
Acidi Nitrici fluidrachmas undecim ;
Olei Bubuli recentis fluiduncias novem ;
Adipis uncias tres.
Hydrargyrum in Acido liqua ; dein Oleum et Adipem simul liquefac, et cum primo lentascent, liquorem adijce, et misce.

We are warned by the length to which this Review has been extended, that it is time to draw to a close without noticing all the changes and improvements which we have marked for criticism. We have said enough to establish the correctness of the opinion we have more than once expressed, of the great superiority of the present over the former Pharmacopœia. It is, as a Latin composition, written in a correct and pure style ; the language of the American trans-

lation is clear and concise: there is great symmetry in the arrangement and in the formularies; the chemical and natural history departments have been prepared with learning fully adequate to the task; the pharmaceutic part is neat and elegant; and we are not able, after the closest scrutiny, to point to a single typographical error.

Before we conclude we cannot withhold the expression of an honest pride and satisfaction, in perceiving how much the Journal of the College of Pharmacy has contributed to the improvements adopted in this revision of the Pharmacopœia. The convention has introduced into it, with slight variations, Thomas Evans's formula for the Black Oxide of Mercury; E. Durand's Aromatic Syrup of Rhubarb; Dr Staple's process for obtaining Morphia; D. B. Smith's formula for Syrup of Garlic and Extract of Lead; W. R. Fisher's for Citrine Ointment, and W. Hodgson, Jun.'s for the Compound Syrup of Sarsaparilla. We wish they had also adopted the process given in Franklin R. Smith's paper on Bi-carbonate of Soda, which is that used by the manufacturing chemists, and is very far superior to the old mode of preparation.

We trust, that before the return of the period for a third revision of this truly national work, the progress of Pharmaceutic Science in our country will be such, that every department of the Pharmacopœia will undergo a thorough experimental examination, so that the materials, for a more complete and rigid reformation than even the present, will be at hand, for the use of the convention to whom the delicate task may be entrusted.

MISCELLANY.

Alkaline Extract of Jalap, by E. Durand.—Dr Reese, in his work upon costiveness, speaks highly of an alkaline extract of jalap, prepared at the Medical Hall, 170 Piccadilly, London, as the medicine which agrees best with the stomach and small intestines, and to promote fecal secretions of the colon, without irritating the rectum. He gives no recipe for the preparation of this article; but mentions only that it is obtained by gently evaporating, in a water bath, an infusion of jalap in proof spirit, with the addition of a small quantity of carbonate of potassa to prevent the separation of the resin from the gum, on the evaporation of the alcoholic menstruum.

Having been requested by several physicians to prepare some of this extract, I operated in the following way: I digested for several days, at a common temperature, two pounds of pulverized jalap in one gallon of alcohol of 23° of Baume's areometer; I strained and filtered the liquor which I evaporated slowly, in a water bath, to the consistence of a pilular extract; adding, from the beginning, small portions of carbonate of potassa, every time the resin began to separate from the liquid. The whole amount of alkali used was about twelve drachms.

I obtained thus seven ounces and a half of a beautiful extract of a reddish brown colour, possessing an alkaline taste; but none of that nauseous, irritating sensation peculiar to the powder or tincture of jalap. As the first part of this operation was made rather hastily, the action of the alcohol was not sufficiently protracted to enable me to obtain all the soluble principles of the jalap; otherwise, I doubt not, that the result would have been nearly double, for the jalap, submitted anew to the action of three quarts of alcohol, yielded a tincture nearly as strongly charged as the first.

The alkaline extracts of jalap and rhubarb may become highly interesting remedies in cases where saline purgatives and drastic or alcoholic preparations are to be avoided; it is a well known fact that resinous purgatives, united with soap or alkalies, act more gently and efficaciously, and without irritating the stomach and intestines. The soaps of aloes, scammony, jalap, &c. have of late been in great use in Europe; they are generally prepared by dissolving in alcohol one part of resin with two parts of soap and evaporating. The direct *saponification* of resin by the carbonate of potassa would have the advantage of containing more of the active principles in a given quantity than in the above soaps.

Dr Reese administers this extract in the form of pills of three grains each, taken one, two or three, as the case requires, every night or every other night. Dr Horner has exhibited it with success, according to the following direction:

R. Alkaline extract of jalap,

2 drachms.

Syrup of ginger,

2 ounces.

f. sol. one spoonful at a time.

[This article came too late to be inserted in the department of original matter to which it properly belongs.—Ed.]

On the Chloroxalic Acid.—At a meeting of the Royal Academy of Sciences held on the 17th of September last, M. Dumas read a memoir on a new compound, which he calls *chloroxalic acid*, obtained from the action of an excess of dry chlorine upon crystallizable acetic acid, under the influence of the solar rays*. We shall now give a circumstantial account of this discovery.

When dry chlorine is introduced into a bottle containing a small quantity of concentrated acetic acid, and the vessel is exposed to the solar rays in clear weather, white vapours are soon perceived condensing into a liquid that runs by drops along the sides of the glass. Chlorine disappears, and in fifteen or twenty minutes, if there is an excess of acid and if the sun is very hot, the bottle becomes perfectly transparent. In this case, when the stopper is taken off, the vessel is found to be filled with hydrochloric acid and a very penetrating vapour; but the other products generated cannot be easily separated from the excess of acetic acid. When, on the contrary, the acetic acid is used in a quantity less than is necessary to destroy all the chlorine, a new product is obtained, besides hydrochloric acid, which crystallized on the sides of the bottle.

If the vessel be exposed the whole day to the solar rays, crystallization takes place towards evening or during the night. These crystals settle in the shape of fern leaves, or they are distinct and isolated. They are colourless and in rhomboidal laminae sometimes half an inch broad. In order to get them out of the bottle, M. Dumas introduces, by means of a bellows furnished with a long tube, a sufficiency of air to expel the excess of chlorine and hydrochloric acid gas. The vessel is then washed with a small quantity of distilled water, which is evaporated in the vacuum of an air pump, by placing near it two vessels filled, one with quick lime, and the other with sulphuric acid. The product yielded by this evaporation is a white crystalline mass constituting the new compound, which could not be obtained by evaporation in the free air, on account of its great deliquescence. The evaporation by heat would fail likewise, because the heat and the presence of water would partially decompose it, and it is exceedingly volatile.

Finally, if the experiment were made in a vessel containing a notable excess of acetic acid, no product would be afforded, even when the chloride generated an abundance of crystals on the sides of the glass. The excess of acid causes the mass to remain liquid for a long time in the vacuum of the air pump. The presence of the new compound is easily recognized by the smell; but crystallization is incomplete or null even after two weeks; whilst, if the product is well prepared and without excess of acetic acid, it takes place in a few hours.

By introducing more chlorine in the vessel that contained an excess of acetic acid

* The hydrated acetic acid may be considered as a compound of equal volumes of hydrogen and oxide of carbon. M. Dumas suspected that by the reaction of chlorine upon that body, hydrochloric acid and a compound of chlorine and carbon would be produced. The expectations of this chemist have been realized.

and exposing again to the action of the solar rays, we may sometimes succeed in obtaining the new compound, but, generally, crystallization does not take place easily. The proportions adopted by M. Dumas are the following: a *livre* (a little more than the English quart) of dry chlorine to nine *decigrammes* at most (13.8996 grains) of crystallizable acetic acid of 14° or 15° \pm 0. Chloroxalic acid is not always obtained in a state of purity from the first crystallization; it is, generally contaminated with oxalic acid, from which it is separated by exposure to a temperature of 45° to 50° centigrade (113° to 123° Fahr.); it fuses at this point, whilst the oxalic acid remains solid. The liquor is now filtered and placed in the vacuum of the air pump for a few hours. It recrystallizes; but yet it retains sometimes a small quantity of oxalic acid.

Chloroxalic acid is solid, crystallizes in rhombs with angles from 80° to 100°; it is exceedingly deliquescent and affords by distillation some hydrochloric acid, carbonic acid gas and a carbonous sediment. A part of it passes without decomposition. This substance is composed, according to M. Dumas's analysis, of

Chlorine,	1 atom	48.8 parts
Carbon,	2 do	16.6
Oxygen,	2-3 do	33.2
Hydrogen,	1 do	1.4

100.0

It is purely white and inodorous; but leaving upon the tongue a burning sensation with hardly any discernible taste of acid; the tongue becomes white all at once as with oxygenated water. When the first impression is over, it leaves behind an aromatic bitter taste. The chloroxalic acid exercises a powerful reaction upon vegetable colours; it is liquid at about 45° cent (113° Fahr.) and crystallizes at 1 degree below that (2° Fahr.). Melted and permitted slowly to cool, it forms voluminous rhomboid crystals. Heated in the vacuum, it boils at 200° cent. (392° Fahr.) and volatilizes wholly in white vapours, which crystallize instantly on the sides of the bell, as a brilliant hoar-frost; its point of ebullition, under the ordinary pressure, must, consequently, be 300° cent (572° Fahr.). It reddens litmus, and dissolves easily in ether which takes it up from its aqueous solution.

The chloroxalates are very soluble; M. Dumas has investigated the properties of several of these salts; but he thinks they are not sufficiently interesting to be submitted to the academy.—*Journal de Chimie et de Toxicologie, communicated by Julia Fontenelle.*
E. D.

Meeting of the Parisian Society of Pharmacy.—On the 11th of August last, M. Charlot made known to the society, that he had succeeded in bleaching and disinfecting rancid, faulty substances, by means of the chlorides of the oxides of calcium and sodium.

M. Guesneville, Jun. announced that he had discovered an easy method for separating the osmium and iridium from the platinum ore. He introduces into a porcelain tube which he carries to red heat, the black residue left by the hydrochloro-nitric acid, and treats it with a current of chlorine. The osmium and iridium are converted into chlorides and sublime. He then takes advantage of the difference of their degree of solubility to separate them.

On the 13th of October, a letter from Mr Rose of Berlin to MM. Robiquet and Serullas announces that a crystallizable principle has been obtained by M. Bistok from the colombo root. This product is intensely bitter, and has much the appearance of asparagine; it crystallizes in hexahedral prisms.

French Institute.—At a meeting of the institute, held the 18th October, M. Gay Lussac read a letter from M. Leroux, containing a new process for preparing salicine more easily than that published some time ago. He presented, at the same time, a bottle full of this febrifuge article, and announced that M. Leroux will be able to furnish tolerably large quantities of this substance, at the rate of five francs per ounce.

Mode of discovering the quantities of Alkaloid contained in the Barks of the Cinchona, by Viltman.—This process has, according to its author, the advantage of enabling the operator to experiment upon minute quantities and unites a great degree of precision to a tolerably easy execution. Fifty-five grains of finely pulverized bark are mixed accurately with an equal quantity of washed quartz sand, of half the size of a poppy seed. To this mixture are added five drops of hydrochloric acid, and twenty drops of alcohol, and the whole pressed gently into a glass tube four or five inches long, and about five lines diameter, one of the ends of which is closed with a piece of muslin, in the form of a small sieve, and plunged into a close vessel. This tube communicates, by means of a bent tube, with a small matrass, filled with a mixture of one ounce and a half of alcohol, and twenty drops of hydrochloric acid. The diameter of the bent tube must be about four-fifths of a line, and one of the ends must go to the bottom of the matrass, whilst the other must not go farther down than the surface of the mixture of bark and sand. The alcohol contained in the matrass is carried to ebullition by means of a small spirit lamp, and extracts in this manner all the soluble parts of the mixture in the great tube. If this ebullition is slow, the last drops of alcohol come out colourless.

The alcoholic tincture, of a brownish red colour, is precipitated with hydrated lime. After the lapse of twelve hours, the precipitate is separated by means of a filter; the alcoholic solution is then rendered very slightly acid, and reduced by evaporation to a soft resinous matter, which is dissolved in two drachms of distilled water, and then precipitated by a few drops of caustic ammonia. The precipitate is dried, and indicates the quantity of alkaloid contained in the bark.

By means of this process, Mr Viltman has found that:

100 parts of Carthagen bark contain	3,30 parts of alkaloid,
100 " Huantero bark "	3,5 " cinchona,
100 " Royal or Calysaya "	5,0 " quinia,
100 " Red bark "	6,0 " quinia and cinchona.

Journal de Chimie et de Toxicologie.

Alcoolatures or Tinctures, prepared with Vegetable Juices.—We find in the Journal de Pharmacie for November 1830 some formulæ for preparations that are out of the ordinary track, and as every thing relating to improvements or changes in pharmacy is interesting, we give them an insertion in our Journal.

The author (un inconnu) observes that as by desiccation, certain plants lose part of their most volatile principles or undergo changes in their composition, it is certain that their medicinal action cannot be the same as it was before drying. Tinctures being usually made from these dried articles cannot therefore be possessed of the primitive properties of the substances, of which they are composed. This fact is the more worthy of consideration, since the desiccation of plants is in a great measure performed by persons who are ignorant of pharmacy, and they are thrown into market in a truly lamentable state of deterioration.

These considerations furnish sufficient argument in favour of employing the tinctures prepared with alcohol, and the vegetable juices. In these new tinctures as

well as in the old ones, it is the "*hydraalcohol*," or diluted alcohol, of 22° B. that is employed as the menstruum. By evaporation these alcooolatures furnish extracts less alterable than those obtained by the direct concentration of the juices. The addition of alcohol to a filtered juice determines a precipitate more or less abundant, of which the colour varies according to the species of juice submitted to its action: thus the poisonous sumach furnishes a beautiful white precipitate.

In order to distinguish these tinctures from those prepared with the vegetables entire, the author proposes for them names entirely distinct. Thus he gives the name of *alcooolature of the juice of cicuta* to that prepared by a mixture of equal parts of the juice of this plant and alcohol; while that made with the leaves themselves bears the old title of *tincture of cicuta*.

The alcooolatures are not designed to replace the ordinary tinctures; they constitute a distinct class, the operation of which ought to be separately studied.

FORMULÆ.

Alcooolature of the Juice of Belladonna.

- R. Rectified alcohol of 35°;
Recent and filtered juice of belladonna, each 1 part.

Alcooolature of the Juice of Digitalis.

- R. Rectified alcohol of 35°;
Recent and filtered juice of digitalis purpurea, each 1 part.

Of Hyosciamus.

- R. Rectified alcohol of 35°;
Recent and filtered juice of the leaves of hyosciamus, each 1 part.

Of the Juice of Tobacco.

- R. Rectified alcohol of 35°;
Recent and filtered juice of the leaves of the nicotiana tabacum, each 1 part.

There are several others which follow these, but as the principle and proportions are the same in all, it is unnecessary to translate them. There appears to be an oversight with respect to the strength of the alcohol. In the remarks it is stated that it should be the hydraalcohol of 22° B., while in the formulæ it is uniformly directed of 35°.

On Nitrate of Silver as a test for detecting the presence of minute quantities of vegetable and animal matters in water.—Nitrate of silver dissolved in pure water is not altered by the sun's rays. If the minutest quantity of vegetable or animal matter is present, the solution is discoloured; and with common distilled water, the discolouration is strong. To prove that the cause of the change of colour is the one assigned, it is sufficient to allow the coloured matter to subside, decant the colourless solution, and expose it again to sunshine. However powerful the sun's rays are, no further effect is produced; but add more common distilled water, and the phenomenon will instantly reappear.

Note to the Article on Ichthyocolla.

[Ante, page 22.]

Owing to the lateness of the period at which it was written, this paper was sent to the press in an unfinished state. It is proper to add that the *weak fish* is the *Squeteague* of the Narragansett Indians, and the *Labrus Squeteague* of Dr Mitchell's paper on the fishes of New York. The Doctor notices that "its swimming bladder is convertible into good glue," and adds in his characteristic manner, "I have eaten as fine blanc mange from it as from the isinglass of the sturgeon."

In the paper of Humphrey Jackson which I have quoted, it is stated "it is now no longer a secret that our lakes and rivers in North America are stocked with immense quantities of fish, said to be of the same species with those in Muscovy, and yielding the finest isinglass; the fisheries whereof, if duly encouraged, would doubtless supply all Europe with this valuable article. It is further said, "that in consequence of public advertisements distributed in various parts of North America offering premiums for the sounds of sturgeon and other fish, for the purpose of making isinglass, several specimens of fine isinglass, the produce of fish taken in those parts, have lately been sent to England, with proper attestations as to the unlimited quantity which may be procured."

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JOURNAL

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PHILADELPHIA COLLEGE OF PHARMACY.

JULY 1831.

Original Communications.

ARTICLE XII.—On *Sanguinaria Canadensis*. By Daniel B. Smith.

Nat. ord. PAPAYERACEÆ.

Lin. meth. POLYANDRIA MONOGYNIA.

SANGUINARIA. Cal. 5-phyl.-deciduous. Petals, 8. Stigma, sessile, 2-grooved. Capsule, superior, oblong, 1-celled, 2-valved, apex attenuated. Receptacles, 2, filiform, marginal.—Nuttall.

S. canadensis. Root tuberous, horizontal, giving out a reddish and very acrid lactescent sap. Leaves solitary, radical, reniform and lobed, scape naked, 1-flowered, sheathed at base, petals variable in number. April and May. Perennial.—Nuttall.

THIS beautiful species is one of the earliest flowering plants of North America, and expands its showy white petals along with the *Hepatica Triloba*, the *Violas* and the *Epigea Repens* beneath the first genial warmth of spring. It grows throughout the United States, and its favourite situation is the shady border of woods in a rich light soil. The root of the *Sanguinaria* is of a rich brown colour, horizontal, abruptly terminated, fleshy, about the thickness of a finger,

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frequently twisted, and very juicy. It may be readily distinguished by the colour of its juice, which is of a bright orange, and tinges woollen or silk of a deep and rather permanent yellowish red. The root is furnished with numerous slender radicles, and makes offsets from the side, which succeed to the old plant, and thus acquire the præmorse character that marks the species. The leaf and flower spring up together; the folded leaf enveloping the scape and flower bud, and rolling back as the latter expands. The stem is simple, smooth, from six to twelve inches in height, and terminated by a single reniform or somewhat heart-shaped deeply lobed leaf. The leaf is smooth, of a deep green on the upper surface and pale or light bluish beneath, and strongly marked by veins, which are tinted with the orange-coloured sap that pervades the whole plant.

The scape is one flowered, round and smooth. The calyx is two-leaved and falls off as soon as the flower opens; its leaves are obtuse and ovate. There are usually eight petals, although they vary from that number to fourteen. The petals are spreading, ovate, obtuse and concave. The stamens are numerous, with yellow filaments, shorter than the corolla and orange-coloured oblong anthers. The germ is oblong, compressed; the stigma sessile, thick, two-furrowed or somewhat lobed, permanent. The capsule is oblong, sharp at both ends, two-valved. The seeds are numerous, round, deep, shining, red, somewhat pointed and having a white arilla.

The blood-root, as it is commonly called, from its most striking peculiarity, is termed Puccoon in the native Indian dialects. It is used as a dye by the Indians to stain their baskets, skins, &c.

Its taste is acrid and bitter, and leaves a strong sensation of heat in the mouth and throat.

Its medical properties are those of an acrid narcotic, acting in doses of from ten to twenty grains as a dangerous, irritant, and emetic. The whole plant possesses active pro-

perties, although the root is the part which has been most carefully examined.

Dr Dana of the university of New York instituted a set of experiments on this root in 1824, and succeeded in obtaining an alkaline substance from it, which is probably the active principle of the plant. This principle, which he calls *sanguinarina*, may be obtained by digesting the finely powdered root in absolute alcohol, and adding to the tincture, a solution of ammonia, so long as it occasions any precipitate. A gray powder falls down, which is to be collected and boiled in water with some pure animal charcoal and the liquid then filtered. Alcohol is to be digested on the matter remaining on the filter, and afterwards evaporated to dryness. A white, pearly substance remains, having an acrid taste, rendering brown the yellow of turmeric, and changing the infusion of purple cabbage to a green. This substance is the *sanguinarina*. It is very sparingly soluble in water; but is soluble in ether and very soluble in alcohol. With tincture of galls it affords a precipitate soluble in alcohol, but insoluble in ammonia. It combines with acids and forms salts, which all present some shade of red, crimson or scarlet, of great intensity and beauty. The salts are soluble in water and alcohol, and form red coloured solutions of great beauty. The muriate and the acetate are peculiarly pungent and acrid. When the salts of *sanguinarina*, prepared with diluted acids, are decomposed by potassa, ammonia, lime or magnesia, the vegeto-alkali is obtained in an unaltered state. But, if the salt has been prepared with concentrated acid, the decomposition is not complete, but a dark purple precipitate is formed which appears to be a sub-salt.

The experiments of Dr Dana have been so far repeated as to confirm his principal statements, of the characters of this new alkaline principle. The subject is one which merits further elucidation, and we wait with impatience for the publication of the researches of Dr Augustus Hayes, who was engaged in these inquiries at the date of Dr Dana's publication in 1827.

The medicinal properties of *sanguinaria* have been carefully investigated by Dr Tully, an eminent practitioner of New Haven, Conn., who attributes to it the virtues of squill, *seneka*, *digitalis*, *guaiacum* and *ammoniacum*.

The leaves are said by Dr Downey to be in use by the farmers in Maryland, in diseases of horses, to make them sweat, and Dr B. S. Barton says the seeds are violent narcotics, resembling those of *stramonium* in their properties.

The plant belongs to the natural order of *papaveracæ*, and possesses the leading properties of that order.

The United States Pharmacopœia directs a tincture made with four ounces of the bruised root, to two pints of alcohol, the dose of which is a small teaspoonful.

Dr Bigelow says, that many physicians prefer an infusion made with a drachm of the powder to a gill of water, a table spoonful of which is a dose.

It is said to form the principal ingredient in Rawson's bitters, which have gained much celebrity as a remedy in jaundice. The root loses much of its acrimony in drying, and should therefore be frequently renewed in the shops, where it has become a regular article of sale.

ART. XIII.—*Dissertation upon the subject of Peruvian Bark.*

By Geo. B. Wood, M.D.

[Continued from page 38.]

Commercial history.—For more than a century after the *Cinchona* came into use, it was procured almost exclusively from Loxa, and the neighbouring provinces. In a memoir published A.D. 1738, La Condamine speaks of the bark of Rhiobamba, Cuenca, Ayaraca, and Jaen de Bracomeros. Of these places, the two first, together with Loxa, lie within the

ancient kingdom of Quito, at its southern extremity; the others are in the same vicinity, within the borders of Peru. The drug was shipped chiefly at the port of Payta, from which it was carried to Spain, and thence spread over Europe. Beyond the limits above mentioned, the Cinchona was not supposed to exist, till, in the year 1753, a gentleman of Loxa, familiar with the aspect of the tree, discovered it while on a journey from the place of his residence to Santa Fe de Bogota, in numerous situations along his route; wherever, in fact, the elevation of the country was equal to that of Loxa, or about six thousand five hundred feet above the level of the sea. This discovery extended quite through Quito into the kingdom of New Granada, as far as $2\frac{1}{2}^{\circ}$ north of the equator. But no practical advantage was derived from it; and the information lay buried in the archives of the vice-royalty till subsequent events brought it to light.

To Mutis undoubtedly belongs the credit of making known the existence of the Cinchona in New Granada. He first discovered it in the neighbourhood of Bogota, in the year 1772. A botanical expedition was sometime afterwards organized by the Spanish government, with the view of exploring this part of their American dominions; and the direction was given to Mutis. The researches of the expedition eventuated in the discovery of several species of Cinchona in New Granada; and a commerce in the bark was soon commenced, which was afterwards increased, and carried on with great vigour through the ports of Carthagena and Santa Martha. The English and North Americans, opening a contraband trade with these ports, were enabled to undersell the Spanish merchant, who received his supplies by the circuitous route of Cape Horn; and the barks of New Granada were soon as abundant as those of Loxa, in the markets of Europe.

To these sources another was added about the same time, A.D. 1776, by the discovery of the Cinchona in the centre of Peru, in the mountainous region about the city of Huanuco, which lies on the eastern declivity of the Andes, to the N. E. of Lima, at least 6° to the south of the province of

Loxa. To explore this new mine of wealth, another botanical expedition was set on foot, at the head of which were Ruiz and Pavon, the distinguished authors of the *Flora Peruviana*. These gentlemen spent several years in this region, during which time they discovered the numerous species that were afterwards described in their *Flora*. Several of their species, however, are now considered identical with the *C. lancifolia*, previously described by Mutis. Lima became the entrepot for the barks collected around Huanuco; and hence originated the name of Lima bark, so often conferred in common language, not only upon the varieties received through that city, but also upon the medicine generally.

Soon after the last mentioned discovery, two additional localities of the *Cinchona* were found, one at the northern extremity of the continent near Santa Martha, the other very far to the south, in the provinces of La Paz and Cochabamba, then within the vice-royalty of Buenos Ayres. These latter places became the sources of an abundant supply of excellent bark, which received the name of Calisaya, probably from a district of country where it was gathered. It was sent partly to the ports on the Pacific, partly by a much longer passage to Buenos Ayres.

The consequence of these discoveries, following each other in such rapid succession, was a vast increase in the supply of bark, which was now shipped from the ports of Guayaquil, Payta, Lima, Buenos Ayres, Carthagena, and Santa Martha. At the same time, the average quality was probably deteriorated; for, though many of the new varieties were possessed of excellent properties, yet equal care in superintending the collection and assorting of the article could not be exercised, now that the field was so extended, as when it was confined to a small portion of the south of Quito, and north of Peru. The varieties which were poured into the market, soon became so numerous, as to burthen the memory, if not to defy the discrimination of the druggist; and the best pharmacutists found themselves at a loss to discover any permanent peculiarities which might serve as the basis of a proper and

useful classification. This perplexity has continued, more or less, to the present time; though the discovery of the new alkaline principles has presented a ground of distinction which was before unknown. The restrictions upon the commerce with South America, by directing the trade into irregular channels, also had a tendency to deteriorate the character of the drug. In the complexity of contrivance to which it was necessary to resort, to deceive the vigilance of the government, little attention could be paid to a proper assortment of the several varieties; and not only were the best barks mixed with those of inferior species, and less careful preparation; but the products of other trees bearing no resemblance to the *Cinchona* were sometimes added, having been artificially prepared so as to deceive a careless observer. The markets of this country were peculiarly ill-furnished. The supplies, being derived chiefly by means of a contraband trade with Carthagena and other parts of the Spanish main, or indirectly through the Havannah, were necessarily of an inferior character; and our traders, finding a better market in Europe for the superior kinds, brought home only the refuse of their cargoes. A great change, however, in this respect has taken place since the ports on the Pacific have been opened to our commerce. The finest kinds of bark have thus been rendered directly accessible to us; and increased intelligence in the community has co-operated with the facility of supply, to exclude from our markets, that kind of trash with which they were formerly glutted.

A curious account is given by Humboldt of the influence of commercial monopoly, over the reputation of the different kinds of bark. So long as Loxa and its neighbourhood continued to be the only source of supply, the complete control of the trade belonged to a few mercantile houses at Cadiz; but after the discovery of the *Cinchona* trees by Mutis in New Granada, it was found impossible to confine the commerce in this article within such narrow limits; and it became a matter of importance to those houses to undervalue what they could not make conducive to their own pecuniary advantage.

Complaisant botanists were found who denied the identity of the species of *Cinchona* growing about Bogota, with those of the original locality in the south of Quito; and physicians undertook to decide that the efficiency of the various barks depended upon their growth within certain degrees of latitude. As the trade in the barks discovered about Huanuco in Peru naturally came into the same hands with that of the barks of Loxa, the former were not found to deserve equal condemnation with those to the north of the equator. So great an influence was exerted over public opinion in Spain, by this self-interested combination, that a quantity of the orange-coloured bark of Santa Fe de Bogota which had been collected by Mutis in New Granada, was condemned to be burned in the public market place of Cadiz. A part of the bark, thus destined to the flames, was secretly bought by English merchants and shipped to London, where it brought great prices. This influence, however, did not extend beyond Spain and perhaps France; for the barks of New Granada, which were brought by the contrabandists into Europe from Carthagená and Santa Martha, had the preference in England, Germany, and Italy, over those imported by the route of Spain.

The above account, however, though given by Humboldt, should be received with much allowance. This philosophic traveller, having had much intercourse with Mutis, and perhaps enjoyed his hospitality in South America, was very naturally influenced by his representations, which were not those of an impartial observer. The part performed by Mutis in the discovery of the barks of New Granada, and in their introduction into use, enlisted his partialities in their favour, and neither he nor his pupils could listen with complacency to the claims of superiority which might have been honestly urged in favour of those of Quito and Peru. Whatever might have been the motives of the merchants, botanists and physicians, whom Humboldt intimates to have conspired against the produce of the *Cinchona* of New Granada, it is certain that time has confirmed, to some extent at least, the

correctness of their representations ; for it is now universally admitted, that the Carthagena barks are in every respect inferior to those derived from the ports on the Pacific ; and the conjecture has been ventured, that the bark condemned to be burned at Cadiz might have merited its sentence.

The persons who collect the bark are called in South America, *Cascarilleros*. Considerable experience and judgment are requisite to render an individual qualified for this business. He must not only be able to distinguish the trees which produce good bark from those less esteemed; but must also know the proper season and the age at which a branch should be decorticated, and the marks by which the efficiency or inefficiency of any particular product is indicated. The dry season, from September to November inclusive, is the harvest of the bark-gatherers. They separate the bark by making a longitudinal incision with a sharp knife through its whole thickness, and then forcing it off from the branch with the back of the instrument. Other means are resorted to when the trunk or larger limbs are decorticated. They consider the branch to be sufficiently mature, when the inner surface of the bark begins to redden upon exposure to the air, within three or four minutes after its removal. The next object is to dry the bark in the sun. In the drying process it rolls itself up, or in technical language becomes quilled; and the degree to which this effect takes place, is in direct proportion to the thinness of the bark, and in an inverse ratio to the age of the branch from which it was derived.

In packing the bark for exportation, due care is seldom taken to assort the varieties according either to the species of *Cinchona* by which they are furnished, or to their resemblance in appearance and character ; and it often happens that several different kinds are introduced into the same case. The packages are, in commercial language, called *seroons*. As found in this market, they are covered with a case of thick and stiff ox hide, which is lined within by a very coarse cloth apparently woven out of some kind of grass. Occasionally even very good bark is bound up in bags of this coarse cloth,

without any covering of skin, so that air and moisture are freely admitted, and the drug is thus exposed to injury. This was the case with some very fine red bark which came under my own notice, recently imported from Guayaquil.

The American druggists, till within a few years, derived their best bark from London, whither it was brought from Cadiz; but since the commerce with South America has been freely opened to us, we have been enabled to supply ourselves immediately from the places of production. Our ships, trading to the Pacific, run along the American coast from Valparaiso in Chili to Guayaquil, on the western coast of Colombia, stopping at the intermediate ports of Coquimbo, Copiapo, Callao, Truxillo, &c., from all which they probably receive supplies of bark, in exchange for the mercury, piece goods, flour, &c., which constitute their outward cargo.

Means of distinguishing good Bark.—To the druggist and apothecary, it is highly important to possess the means of deciding upon the relative value of the numerous varieties of bark of every quality brought into market, or at least of discriminating between the energetic and inefficient. The following rules are given by men who pretend to a familiar acquaintance with the subject. They are essentially the same with those which, according to Dr Devoti, a physician of Lima, are practised in South America, in choosing the barks proper to be admitted into commerce.

In forming a judgment, it is necessary to consider whether the bark has been taken from a branch of the proper age, and whether it has been carefully dried. Very young bark has not acquired the virtues which render the medicine valuable; that derived from the trunk or older branches has often been injured by time, or by the action of parasitic plants; and to hasten the drying process in some mountainous situations where the sun has little power, or to increase the rolling, a certain degree of which renders the drug more saleable to the merchants, it is said not to be an uncommon practice to expose the fresh barks injuriously to artificial heat. Bark more than an inch and a half in width must have come

from the trunk or great branches; that which is smaller than a goose quill, from young and immature branches; and both are deemed of inferior quality. The same remark is applicable to the degree of thickness; but in forming a judgment on this point it is necessary to take the species into consideration. Though, as a general rule, very thin or very thick bark is of inferior quality, yet specimens have been found very effectual upon trial, which have not fallen within the limits usually esteemed the most proper in this respect. That which exceeds a line in thickness is said not to be esteemed at Cadiz. The specific gravity of bark is also considered, in some measure, a criterion of its value, the heaviest being most esteemed. The fracture should be to a certain extent, splintery: if sharp and short, it indicates too great age: if the fibres are very long, there is reason to apprehend a want of maturity. The rolling of a bark affords another ground of judgment, though by no means to be relied on, as some excellent varieties are almost or quite flat. A feeble rolling indicates a bark too old or too slowly dried; a spiral form, one that has been gathered before it was ripe, or afterwards exposed to an improper degree of heat. The effects of heat are also observable in the darker colour of the bark, and the appearance of whitish stripes of a sickly hue on the inside.

Some dependence is placed by the South Americans upon the appearance of the epidermis; and the following commercial varieties have had their origin in this source: 1. *Negrilla*, blackish; 2. *Crespilla*, crisped; 3. *Pardo-obscura*, dark leopard-gray; 4. *Pardo-clara*, bright leopard-gray; 5. *Lagartijada*, silver or lizard-coloured; 6. *Blanquissima*, very white; and 7. *Cinicienta*, ash-coloured. The first three are most esteemed. It is possible that among those well skilled in the subject, and thoroughly acquainted with the *Cinchona* tree in its natural state, inferences may be drawn from these appearances, as to the elevation upon the mountains, the degree of exposure to the sun, and, sometimes, perhaps, as to the species of the

plant: but little reliance can be placed upon them by persons who are not already too well informed to need instruction.

The properties of colour, taste, and smell, are more important. The colour which, according to Dr Devoti, is most highly esteemed is orange; and the gradations of shades from this to white mark a corresponding diminution in value. A dark colour between red and yellow is considered a sign either of inferiority in species, of improper preparation, or of injurious exposure to air and moisture. The taste should be bitter and very slightly acid, but not acrid, nauseous, nor very astringent. The odour of bark is never very strong; but this quality exists in some degree in the better kinds, and affords a favourable sign when it is decided or peculiar, without being disagreeable.

These remarks are of general application: they will be further extended, when the varieties of bark are separately described.

Classification.—To form a correct and lucid system of classification, is the most difficult part of the subject of bark, which is throughout full of perplexities. An arrangement founded on the botanical species, though the most scientific and satisfactory when attainable, is in the present instance utterly out of the question. There are few varieties of the precise origin of which we can be said to have any certain knowledge, by far the greater number being either derived from an unknown source, or but obscurely traceable to their native tree. Pharmacutists, indeed, are not wanting, who are disposed to ascribe all the genuine barks, yielding quinia and cinchona, to the same species of *Cinchona*. Guibourt has recently advanced the opinion that they are all derived from varieties of the *C. lancifolia*; and adduces in support of it the statement of La Condamine, that when at Loxa he was informed, on good authority, that the barks could not be distinguished by the eye.

The Spanish merchants adopted a system of classification dependent partly on the place of growth, or shipment, and

partly on some inherent property, or on the supposed relative value of the bark. So long as the sources of the drug were very confined, and the number of varieties small, this plan answered the purposes of trade: but at present it is altogether inadequate; and though some of the names originally conferred upon this principle are still retained, they have ceased to be expressive of the fact, are often erroneously, and almost always confusedly applied. The *Loxa* barks embrace, among us, not only those which come from that province, but those also from the neighbourhood of Huanuco, whilst others which have received different names are brought from the same place. It is said that by the traders in South America the young, slender, gray barks are called by the name of *Loxa*, from whatever source they may be derived, while those somewhat larger and older receive their appellation from Lima.

Perhaps the best arrangement for pharmaceutical and medicinal purposes, is that adopted in the United States Pharmacopœia, founded on difference of colour. It is true that dependence cannot be placed on this property alone; as barks of a similar colour have been found to possess very different virtues; and between the various colours considered characteristic, there is an insensible gradation of shade, so that it is not always possible to decide where one ends, and the other begins. Still it has been found that the most valuable barks may be arranged, according to their colour, in three divisions; which, though mingling at their extremes, are very distinctly characterized, in certain specimens, by peculiarity not only in colour, but also in other sensible properties, and even in chemical constitution. The three divisions alluded to are the *pale*, the *yellow*, and the *red*. These may be considered as exclusively the officinal barks: while the inferior varieties, which approach one or other of these classes in colour, but differ in other properties, may be treated as extra-officinal, and considered under a separate head. As these inferior kinds come chiefly, if not exclusively from the northern ports of Colombia, they are known in commerce by the name of Carthagena barks, and by this

name will be described in the present communication. Specimens of little value may be occasionally imported from the Pacific coast of South America; but the quantity is small, as the profit they might yield on their original cost would be inadequate to the expenses of so long a voyage. In describing, therefore, the different kinds of bark, I shall treat *first* of the officinal varieties under the three heads of *pale*, *yellow*, and *red*, and *secondly* of the extra-officinal, under the title of *Carthagenæ barks*. The commercial name will at the same time be given in all instances in which a knowledge of it can be useful in this country. It is proper here to state that the different barks frequently come to us mingled in the same package, and that in deciding upon the character of a *seroon* the druggist is guided rather by the predominance, than the exclusive existence of certain distinctive properties.

1. *Pale Bark.*

The epithet *pale* applied to these barks is derived from the colour of the powder. The French call them *quinquinas gris* or gray barks, from the colour of the epidermis. They come into the market in cylindrical pieces of variable lengths, from a few inches to a foot and a half; sometimes singly, sometimes doubly quilled; from two lines to an inch in diameter; and from half a line to two or three lines in thickness. The finest kinds are about the size of a goose quill. Their exterior surface is usually more or less rough, marked with circular and longitudinal fissures, and of a grayish colour, owing to the lichens which cover the epidermis. The shade is different in different samples. Sometimes it is a light gray approaching to white, sometimes dull and brown, sometimes a grayish-fawn, and frequently diversified by the intermixture of the proper colour of the epidermis with that of the patches of lichens attached to it. The interior surface in the finer kinds is smooth and velvety; in the coarser it is occasionally rough, and somewhat ligneous. Its colour is uniformly a dull orange, sometimes inclining to red, sometimes to yellow; and in some

inferior specimens it is of a dusky hue. The product of the *C. lancifolia* of Bogota probably received the name of orange-coloured bark from the appearance of its inner surface.

The fracture is usually clear, with some short filaments on the internal part only. In the coarser barks it is more fibrous. The colour of the powder is a pale fawn, which is of a deeper hue in the inferior kinds. The taste is moderately bitter and somewhat astringent, without being disagreeable or nauseous. Some authors speak of an acidulous and aromatic flavour, which is perhaps sensible to very delicate palates. The superior kinds have a very feeble odour, which is distinct and agreeably aromatic in the powder and decoction.

The pale barks are chemically characterized by containing much tannin and cinchona, but little quinia. Their appearance indicates that they were derived from the smaller branches. They are collected in the provinces about Loxa, or in the country which surrounds the city of Huanuco to the N.E. of Lima, and are probably obtained chiefly from varieties of the *C. lancifolia*.

In this country, the pale barks are all known in commerce by the general name of *Loxa Bark*. The finest specimens are sometimes called *Crown Bark of Loxa*, a name also applied to them in England and Germany, and evidently derived from the impression that they have the same origin and character with the bark formerly selected with great care, for the use of the king of Spain, and the royal family. It is probable, however, that the best of all the different kinds were appropriated to the royal use; and the honour was certainly shared by the yellow with the pale. The extension of the term Loxa bark to all the different varieties, which belong to this class, is peculiar to the United States, and is not authorized by the facts of the case. They are not obtained exclusively from the province of Loxa, nor from the country bordering upon it. The French and Germans distribute them into at least two distinct divisions, originally named from the place of growth or export, but

depending at present upon peculiarity in properties without any geographical reference. One of these divisions has the title of Loxa bark, the other is called Lima bark by the French, and Huanuco bark by the Germans.

a. The proper *Loxa bark* is in cylindrical tubes strongly rolled, from twelve to eighteen inches long, varying in size from that of a small quill to that of the little finger, very thin and consequently light, and covered with an epidermis more or less rough, marked with transversal fissures, and of a grayish colour. The internal surface is smooth and uniform like that of cinnamon, and of a dull orange-yellow or reddish hue, which becomes brighter upon the application of moisture. The fracture is clear, or but slightly fibrous. Two subvarieties exist in this division, one with a light gray epidermis, called in French pharmacy *Quinquina gris de Loxa*; the other brown or of a dark gray externally, and from this circumstance named *Quinquina gris brun de Loxa*. Guibourt considers the former as identical with the *Cascarilla delgada*, or slender bark, of Spanish commerce. The finest specimens of Loxa bark are thought to be derived from the *C. Condaminea*, and to be the same with that of which Humboldt speaks as having acquired great repute under the name of *Cascarilla fina de Uritusinga*. Among the Loxa barks may be included the *Lagartijada*, or Lizard-coloured, of the South Americans. Much of the Loxa bark is said to be derived from the *C. scrobiculata* of Humboldt, considered by Lambert identical with the *C. purpurea* of the Peruvian Flora.

b. The *Lima bark* of the French, or *Huanuco* of the Germans and Spaniards, was introduced into notice about the year 1779, after the discovery of the Cinchona trees in the central region of Peru. The first name originated from the circumstance that the bark entered into commerce through the city of Lima; the second was derived from the name of the city, in the more immediate neighbourhood of which the trees were found. The finer sort of Lima bark is scarcely distinguishable in description from that of Loxa. The French

call it *Quinquina gris fin de Lima*, The coarser kinds are more strongly marked. The size varies from that of the little finger, to that of the thumb. Their external surface is rough, with transverse fissures closely arranged, and an epidermis which, though sometimes thin and adherent, is frequently thick and spongy, and easily separable in small scales, which leave numerous circular impressions. The bark is thick, and breaks with a fracture which is close on the exterior, but woody or fibrous on the interior. The internal surface is yellowish or reddish, and rougher or more ligneous than that of the Loxa bark. The French call this sub-variety *Quinquina gros de Lima*, and when the epidermis is white, as it sometimes is from the presence of chalky cryptogamous plants, they call it *Lima blanc*. Under this head of Lima barks, are included by some authors the *Cascarilla ferruginea* or ferruginous bark of the Spaniards, so named from the tawny ochreous appearance of its epidermis; and the variety called *Havannah* bark, distinguished by its gray epidermis with a reddish or rosy tint. In the same class are also placed by M. Laubert the *Cascarilla bobo de Hojas Moradas* of the Peruvians, derived from the *C. purpurea*, and the *Leonado obscura*, distinguished by the tawny colour both of the epidermis and cortical layers.* These latter varieties, however, are little known, and not highly esteemed. It is probable that most of the Lima or Huanuco barks are derived from varieties of the *C. lancifolia*, the *C. hirsuta*, and the *C. purpurea*. They are generally considered inferior to those of Loxa, and their somewhat less bitter and more nauseous taste would seem to justify this opinion.

In the above account, the different varieties of pale bark, with their several commercial names, have, perhaps, been more particularly noticed, than is requisite for the ordinary purposes of pharmacy: but the student will find an advantage, when perusing works on the subject of this important

* *Cascarilla bobo de Hojas Moradas* signifies Mulberry-leaved booby-bark, and is said to have derived a portion of its name from an idea that it is better than it looks. *Leonado obscura* signifies dull lion-coloured.

drug, in being able to understand the distinctions referred to by authors, and the terms familiarly employed by them, even though he should not thereby be rendered more competent to judge of the qualities or practical application of the medicine. In this country, the pale bark appears to be falling into disuse; and the sales made by the druggists have, I am informed, been much diminished. As it yields very little quinia, it is not employed in the manufacture of the sulphate of this alkali, which has almost superseded the bark as a remedy in intermittents; and the red bark is preferred by physicians, when it is necessary to resort to the medicine in substance. There is little doubt, however, that *cinchonia* possesses febrifuge properties, little if at all inferior to those of *Quinia*; and should the source of the latter begin to fail, the pale bark would come into more extensive use for the preparation of the former.

2. Yellow Bark.

The official term yellow bark should be considered as applicable only to the valuable varieties of the drug having this colour. These are all grouped together in commerce under the name of *Calisaya*, said to be derived from a district of country in Bolivia near the city of La Paz, where this variety of bark is collected. The name was afterwards extended to the produce of other and distant provinces, and is now applied to all the barks possessing the properties about to be detailed. Among the druggists they are arranged in two divisions, the quilled and the flat, which sometimes come mixed together in the same seroons, sometimes separate. The appearance of both indicates that they were taken from larger and older branches than those which yield the pale varieties. They are sometimes called by the French *Quinquina Jaune Royal*, from their resemblance to a variety of bark formerly selected for the Spanish king.

The quilled *Calisaya*, *C. Arrolada* of the Spanish Americans, is in pieces from thrée or four inches to a foot and a half long, from a quarter of an inch to two or three inches in diameter, and of equally variable thickness. The epider-

mis is of a brownish colour, diversified by lichens, is marked by transverse fissures, and is often partially separated, and generally easily separable from the proper bark. In the large kinds it is thick, rough, deeply indented by the transverse fissures, and composed of several layers separated from each other by a reddish brown membrane like velvet. This epidermis yields a dark red powder, is tasteless, and possesses none of the virtues of the bark. It is desirable, therefore, to get rid of it before the bark is powdered, as the medicine is thus procured of greater strength. The bark itself without the epidermis is from one to two lines in thickness; of a fibrous texture; and when broken, presents shining points, apparently the termination of small fibres running longitudinally, which, examined by the microscope, are found, when freed from a salmon-coloured powder that surrounds them, to be yellow and transparent. They readily separate, when the bark is powdered, in the form of spicula, which like those of Cowhage insinuate themselves into the skin, and produce a disagreeable itching and irritation. The colour of the bark is yellow, with a tinge of orange, the taste less astringent than that of the pale bark, but much more bitter and more nauseous. The external cortical layers are more bitter and astringent, and consequently stronger in medicinal power than the internal, probably from the longer exposure of the latter to the action of air and moisture. The odour is faint, but, when the bark is boiled, resembles that of the pale varieties.

The *flat Calisaya*, *C. Plancha*, which appears to have been derived from the large branches and trunk, is in pieces of various lengths, either quite flat, or but slightly curved, generally destitute of the epidermis, and therefore presenting the yellow colour of the bark both within and without. It is usually thicker than the quilled, more fibrous in its texture, less compact, less bitter, and possessed of less medicinal power. Sometimes portions of the sap-wood adhere to its internal surface, and increase its thickness. Though

weaker than the proper bark of the quills, it is usually, in equal weights more valuable than that variety, because free from the useless epidermis.

Along with the varieties above described, others are sometimes enumerated, especially one denominated by Guibourt, and after him by other French writers, *quinquina jaune orangé*, or orange-yellow bark, distinguished by its more compact texture, and its well marked orange colour.

All the valuable yellow barks are characterized by their strongly bitter taste, with comparatively little astringency; by their fine yellow, somewhat orange colour, which is still brighter in the powder; and by containing a large proportion of *quinia* with very little *cinchonina*. The salts of quinia and lime are so abundant in their composition, that their infusion instantly precipitates a solution of sulphate of soda.

Authors are by no means agreed as to the particular species which yields Calisaya bark. Some, influenced simply by its officinal title of *yellow bark*, have attributed it to the *C. cordifolia*, because Mutis gave the same name to the product of this species. The British colleges have fallen into the error, without, however, being aware that the yellow bark which they adopted as officinal was really the *Calisaya*. That it is an error has been fully demonstrated, as no *Calisaya bark* is brought from those regions where the *C. cordifolia* most abounds. Many writers ascribe this variety to the *C. lancifolia*, or the authority of Mutis himself, who asserts that it is indisputably derived from that species. This may possibly be the case; and the supposition of M. Guibourt may be true, that the officinal pale, yellow, and red barks are all derived from varieties of the *C. lancifolia*: but we have no precise information on the subject; and Ruiz himself acknowledges that he is unacquainted with its source. A curious mistake on this subject is made by A. T. Thomson in his dispensatory. Considering the *C. lancifolia* as undoubtedly the origin of the *pale bark*,

and at the same time receiving without hesitation the assertion of Mutis that the Calisaya is the product of this species, he has inferred that the two must be identical; and has therefore given *Calisaya* as one of the synonymes of *pale bark*; while he has accurately described the true Calisaya, but without naming it, under the head of *C. cordifolia* or yellow bark.

The genuine Calisaya bark is produced most abundantly in Bolivia, formerly Upper Peru, in the province of La Paz: and, before the disturbances in these quarters, was shipped as well from the port of Buenos Ayres, as from those on the Pacific. It is at present, however, procured exclusively from the latter. A very fine parcel recently came under my notice, imported directly from Coquimbo in Chili. It is generally supposed to have been first introduced into commerce towards the end of the last century, and it was probably not known by its present name till that period: but La Condamine states that the Jesuits of La Paz sent to Rome, at a period anterior to the discovery of the febrifuge of Loxa, a very bitter bark by the name of *Quinquina*; which, though supposed by that traveller to have been derived from the Peruvian Balsam tree, was very probably, as conjectured by Guibourt, the true Cinchona. Besides, Pomet in his *History of Drugs*, published in 1694, speaks of a bark more bitter than that of Loxa, obtained from the province of Potosi, which borders upon that of La Paz: and Chomel also states that the Cinchona tree grew in the mountains of Potosi, and produced a bark more esteemed than that which grew in the province of Quito. It is probable that, although known at this early period, it may have gone out of use; and its re-introduction into notice towards the end of the last century may have been mistaken for an original discovery. Whether it is found in the other localities of bark in Peru and Quito it is difficult to determine: but we may infer from the existence of a commercial variety known to the Spaniards by the

name of *Calisaya de Quito*, that either the identical bark, or a variety closely analogous to it, has been found in that province. The *Calisaya de Santa Fè*, mentioned by Laubert, has no other claim to the title given it than its colour: and it is not distinguished in the market, perhaps not distinguishable from the ordinary yellow Carthagena bark.

3. Red Bark.

The name of this variety is very appropriately applied, as the colour is usually distinct both in the bark and the powder. In South America it is called *Cascarilla Roja* and *Colorada*. Some writers have divided it into several sub-varieties; but there does not seem to be ground for such division in any essential difference of properties. Like the *Calisaya* it comes in quills and flat pieces, which are probably derived from different parts of the same plant.

Some of the pieces are entirely rolled; some partially so, as if they had been taken from half the circumference of the branch; others are nearly or quite flat. They vary very much in size, the quill being sometimes less than half an inch in diameter, sometimes full two inches, while the flat pieces are occasionally very large and thick, as if derived from the trunk of a tree. They are usually covered with a reddish brown or gray epidermis, which is rugged, has cracks running in different directions, and is in some instances remarkable for numerous projecting points, which correspond with small prominences on the exterior surface of the proper bark. This last peculiarity is made by M. Guibourt the distinguishing character of one of his divisions of the red barks; "*Le quinquina rouge verruqueux*," or *warty red bark*; and another division in his classification is, from the absence of this appearance, entitled, "*Le quinquina rouge non verruqueux*." Beneath the epidermis is a layer, dark, red, brittle, and compact, which

possesses some bitterness and astringency, but much less than the interior parts. These are woody and fibrous, of a more or less lively red colour, which is usually very distinct, but in some specimens passes into the orange and even yellow, so that it is not always possible to distinguish the varieties by this property alone. The taste is bitter and astringent, and the odour similar to that of other good barks. The red bark is chemically distinguished by containing considerable quantities both of quinia and cinchona.

Till very recently it has been almost universally admitted, on the authority of Mutis, that this variety was the product of the *C. oblongifolia* of that author, and of the *C. magnifolia* of the Flora Peruviana, which is generally supposed to be the same species with the former. But it is now well understood that the *red bark of Santa Fé*, the real product of the *C. oblongifolia*, has little else in common with the true officinal red bark than its colour; and belongs properly to the Carthagena barks. This might have been conjectured from the fact, that none of the best red bark is brought from the Atlantic ports of Colombia, through which the product of the *C. oblongifolia* must, at least in part, be sent out of the country. But Burgen is the first author who has satisfactorily shown, that the genuine red bark of commerce was not derived from this species. The proofs advanced by him are the following. A specimen of the bark of the *C. oblongifolia* given by Humboldt to Schröder was found to be the *Quina nova* of commerce, and to bear no resemblance to the genuine red bark; and Humboldt acknowledged to this gentleman that he was unacquainted with the tree which yields the latter. Ruiz and Pavon also, though they frequently mention the red bark, agree in stating that they are ignorant of its source; and in the supplement to the *Quinologia*, mention that the red bark from the *C. oblongifolia* is wholly different from the commercial variety which bears that name.

Besides, in the collection belonging to Ruiz were specimens of the bark of the *C. oblongifolia*, designated by the name of *Quina azahar o roja de Santa Fe*, which were entirely different from the genuine red bark, while they bore an exact resemblance to the *Quina nova*. These arguments of Burgen are still further strengthened by the testimony of Guibourt, who states that a specimen of the red bark of Mutis, the product of his *C. oblongifolia*, which had been presented by this botanist to Humboldt, and by him deposited in the botanical cabinet of the *Jardin du Roi*, was found upon examination scarcely to differ from that known in commerce by the name of *Quina nova*. This *Quina nova* is an inferior kind of Carthagena bark, of a red colour, formerly supposed to be furnished by the *Portlandia grandiflora*, and containing little or none either of *quinia* or *cinchonia*. It appears, therefore, that the valuable red bark is not derived from the *C. oblongifolia*, and that nothing is certainly known of its source. There is some reason to believe that it may be derived from the same species with the pale barks, but taken from the larger branches or the trunk. This opinion receives some support from a statement made by La Condamine in his memoir upon the subject of the Cinchona. We are told by this author that three kinds of bark were known in the neighbourhood of Loxa, the white, the yellow, and the red. The white, so named from the colour of the epidermis, scarcely possessed any medicinal virtue, and was obtained from a tree entirely distinct from that which yielded the two other varieties. The red was superior to the yellow: but he was assured on the very best authority that the trees producing them grew together, and were not distinguishable by the eye. Of the three varieties mentioned by La Condamine, the white does not reach us from Quito, and that which he calls yellow is probably identical with the pale variety of the Pharmacopœia, as this grows most abundantly about Loxa, and before being powdered is often of a yel-

lowish colour. Should it be admitted that the red bark is furnished by the same tree which yields the pale, we have a ready explanation of the difference in size of the two varieties. The following are the words of La Condamine as extracted from his memoir by M. Guibourt in a paper published in the *Journal de Pharmacie*, April 1830. "My host of Cajanuma, who spends his life in the mountain in despoiling these trees, assured me of the fact, which I have since had confirmed by the best informed people, that between the yellow and the red there is no remarkable difference in the flower, in the leaf, in the fruit, nor even in the outer bark; that the eye cannot distinguish them by their external aspect; and that it is only by the introduction of the knife, that the yellow can be recognized by its lighter coloured and more tender bark. The two trees moreover grow side by side, and their bark is indifferently collected, though prejudice is in favour of the red. As to the white bark, the same individual assured me that the leaf was rounder, less shining than that of the others, and even somewhat rough; that the flower is also whiter, the grain coarser, and the bark externally whitish."

Carthagenæ Barks.

Under this head may be classed all the barks brought from the Atlantic ports of Columbia. Like those of Peru and Quito, they may be arranged in several subdivisions, characterized by peculiarities of colour. 1. The most abundant is the *yellow Carthagenæ bark*, which comes in fragments of various sizes, from one to three lines in thickness, usually covered wholly or in part with a whitish epidermis. The bark itself is of a yellow colour, spongy under the teeth, and of a bitter, nauseous taste. It is probably obtained from the *C. cordifolia*, as Guibourt found that a specimen of the bark of this tree, which came originally from Mutis, resembled it precisely in all its sensible properties. 2. Another variety may be called the *brown Carthagenæ bark*. This also has a white epidermis, which is smooth and with-

out fissures. The bark is hard, compact, very heavy, rough, and thick; of a chocolate colour internally; and of a bitter and astringent taste, more disagreeable than that of the pale barks, to which it is in other respects somewhat analogous. Its source is not known. 3. A third variety is the *red Carthagena bark*, readily distinguishable from the officinal red bark by its white, shining, almost micaceous epidermis. It is sometimes compact and bitter, sometimes spongy and with little taste. Guibourt gives the name of spongy Carthagena bark to the specimens presenting the latter character. It is probably derived from the *C. oblongifolia*, and is not much used in this country. 4. Within a few years a variety has appeared in our market under the name of *Santa Martha bark*, which ranks itself by its characters, with those of Carthagena. It derives its name from the port where it is shipped. It is either in small, irregular, oblong fragments; flat or but slightly curved; from one to three lines in thickness, usually destitute of epidermis, and presenting an appearance somewhat as if chipped from the large branches or trunk of the tree; or in short quills partially covered with a whitish epidermis, and evidently derived from the smaller branches. This bark is compact, of a pale yellowish colour, and a bitter, somewhat nauseous taste. It is usually considered superior to the ordinary Carthagena bark, probably from its greater bitterness. May it not be derived from the *C. macrocarpa*, the *C. ovalifolia* of Mutis, which Humboldt informs us grows in the neighbourhood of Santa Martha?

All the Carthagena barks, as will have been observed by the reader, have a white somewhat micaceous epidermis. They are also distinguished by a taste less bitter and more nauseous than that of the officinal varieties; and, though they contain more or less quinia or cinchonia, are by no means abundant in these principles.

ART. XIV.—On Borax.

[Compiled from Dumas by D. B. Smith.]

BORAX is composed according to the best authorities of

1 atom of soda,	32
2 atoms of acid,	48
8 atoms of water,	72

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It crystallizes in a flattened hexahedral prism, terminated by a trihedral pyramid. Its specific gravity is 1.705. It effloresces, melts in its own water of crystallization, and at a red heat fuses into a limpid glass, which is true anhydrous borax, having a sp. gr. of 2.361.

Borax is found native in many places; in the island of Ceylon, southern Tartary, China, Transylvania, Persia, and in the environs of Halberstadt in Saxony. It also exists in large quantities in the mines of Viquintzoa and Escapa, in Peru. It is found abundantly in many lakes in India, whence the greater part used in commerce formerly came.

Turner places the lake from which they extract the Borax in India, at the distance of 15 days journey north of Teschou-Lounbou. It is found in large masses at the bottom near the shore. In the middle of the lake they only find the marine salt.

According to W. Blane and father Rovato, the lakes which furnish borax are situated in the mountains of Thibet; the most celebrated is called *Nubal* and is in the canton of Sumbul. The water is retained in pits which are drawn off at certain seasons of the year, and the salt is found crystallized at the bottom. These crystals are called tinckal; they are impure, yellowish and covered with an earthy coating, which is owing to a salty matter with which the salt is always combined.

Another variety of borax is brought from China, which has been partially purified. Both sorts require a second refining.

The most simple process for purifying borax is to reduce it into powder, and throw on a filter where it is washed with a solution of soda, of the strength of 5° Baumé. The operation which is performed, in order to deprive the borax of the fatty matter which envelopes it, is continued until the liquid passes off uncoloured. The remaining borax is then dried and dissolved in so much boiling water, that the solution shall mark 20° Baumé. A solution of twelve parts of carbonate of soda, for every one hundred parts of crude borax, is then poured in, and after the deposit caused by the soda has subsided, the liquor is filtered. The filtered liquid is then placed over the fire, and concentrated, till it marks 18° or 20°, and is then cooled in cones or quadrangular pyramids of sheet lead inverted, and having an interior doubling; if great care is taken in the process, large isolated crystals of borax, such as are most valued in the arts, will be obtained.

A new species of borax in octahedral crystals has lately been discovered, which is much superior for all practical purposes to the ordinary borax. It contains but half the quantity of water, its specific gravity is 1.815, its hardness is much greater than that of the prismatic borax, and the cohesion of its masses is so great that it can be cut into pieces of any size. In brazing, it swells up less; and flows more freely than the common borax and the value of equal bulks of the two varieties is as 70 to 53.

It is obtained by making a solution of common borax in boiling water, of the strength of 30° Baumé. This is left to cool very slowly, and the octahedral crystals begin to deposit at the temperature of 174°, and continue to form until it is reduced to 133°, after which prismatic crystals alone are obtained. M. Buran, who has prepared it for many years, makes a boiling solution of 1000 lbs. of Borax of 32°. He then covers the vessel so as to prolong the cooling, and at

the end of six days collects the products. These consist of a thick dense layer of octahedral borax, on the surface of which is a little prismatic borax that is easily separated. It appears that a prolonged ebullition is necessary to form the octahedral borax abundantly.

Of latter years the borax used in France has been prepared by M.M. Payen and Cartier from the boracic acid of Tuscany. They heat 125 gallons of water to the boiling point in a copper boiler of double that capacity; 1200 lbs. of crystallized carbonate of soda being then dissolved in it; the fire is covered so that the liquor may not boil, and 1000 lbs. of boracic acid are gradually added. When the saturation is finished, the vessel is carefully covered so as to keep in the caloric and left to repose for thirty hours. At the end of this time, the liquor is decanted in leaden vats for crystallization, which are filled to the depth of ten or twelve inches, and at the end of three days in winter and four days in summer the crystals are formed. These are purified by redissolving in boiling water, and adding ten per cent. of crystallized carbonate of soda. The solution being concentrated till it marks 20° , is poured into pyramidal vessels to crystallize, and the mother liquor is decanted from the crystals when the temperature is reduced to 86° . It is advisable to operate on not less than 2000 lbs. of the salt at a time.

The existence of native boracic acid in the lagoons of Tuscany was discovered by Hocker and Mascagni in 1776. The soil of these lagoons is formed of a soft mud, which is incessantly agitated by the constant discharge of vapours from beneath. The noise of this disengagement is like that produced by steam in escaping through the safety valve of a steam engine, but is much louder and may be heard at the distance of half a league.

It has been attempted repeatedly to prevent the discharge of this vapour, in order to favour some labours necessary for the manufacture of the boracic acid; but although barrels filled with stones were forcibly driven into the holes through

which the vapour escaped; they were always after a few moments raised up and even projected to a great height in the air. This is the more remarkable as these holes are quite large and very numerous in a small space of ground.

The lagoons which are richest in boracic acid are those of Cherchiajo, Monte-Cerboli and Castelnuovo. The funnels of Castelnuovo, through which the vapour is discharged are situated at the bottom of a deep and narrow valley, and ranged in a line near its mouth. Those of Monte-Cerboli cover an extent of one hundred yards in length by fifty yards in width. These little craters are seldom situated on the sides of the hills:—in that case the vapour escapes through crevices of the rocks, in approaching which, a noise like that made by the pouring of water from a narrow necked bottle may be heard.

Most frequently they open at the bottom of a natural or artificial excavation filled with muddy water; and in passing through which the saline substances suspended by the vapour are condensed. These consist chiefly of boracic acid: hydrochloric acid and bitumen can be detected by the smell; and analysis proves the presence of the sulphates of iron, lime, magnesia, and ammonia. The sides of the fissures through which the vapours escape are moreover lined with crystals of sulphur.

The region in which these vapours rise is formed, according to Alexander Brongniart, of calcareous psammite, of common brown compact limestone, with beds of hornstone, marle and argillaceous schists; which proves that they had their origin below the lowest strata of alpine limestone.

The boracic acid is very easily obtained. The liquid mud amidst which the craters are situated is collected and washed with boiling water. These washings are decanted, and undergo a spontaneous evaporation in vessels placed on the ground, the heat of which is sufficient for the purpose.

In this manner three or four per cent of brown acid is ob-

tained, which is purified for commercial purposes by recrystallizing it.

Boracic acid may be obtained more cheaply and easily, from the island of Vulcano, the interior of the crater of which is lined with very pure white fibrous or scaly crystals of acid; to the thickness of about an inch.

Should the boracic acid be obtained from these great natural depositaries at a rate sufficiently cheap, it will hereafter become an article of immense consumption for the glazing of common earthenwares.

SELECTED ARTICLES.

ART. XV.—*On a process for preparing economically the Muriate of Morphia. By William Gregory, M.D. Fellow of the Royal College of Physicians, Edinburgh, and Lecturer on Chemistry.*

IN a note added by Wöhler to the last edition of Berzelius's *Lehrbuch*, several processes are given by Wittstoek for the separation of morphia from narcotine, which is not completely effected by the ordinary process. One of the processes consists in treating the crystals of morphia, supposed to contain narcotine, by muriatic acid in slight excess, which dissolves both, and evaporating until a mass of feathery crystals of muriate of morphia is deposited. The crystals, when freed from the adhering liquid by pressure between folds of bibulous paper, are pure muriate of morphia; the muriate of narcotine being retained in the mother liquid. This process, founded on the fact that muriate of narcotine does not crystallize, I have found to answer very well; but the author directs it to be employed on the crystals of morphia, of course obtained from the alcoholic solution. It struck me that it might be applied to precipitated morphia, and that thus the use of alcohol, so expensive in this country might be avoided. As the muriate of morphia promised to be a salt useful in medicine, I endeavoured to find a method by which as large a quantity as possible might be extracted from opium *without the use of alcohol*. After many trials the following process appeared to answer my expectations.

Opium is cut in small pieces, and completely exhausted by cold water, or water at 90° F. The aqueous infusion is concentrated till it occupies a small bulk, and precipitated by a slight excess of ammonia. The precipitate is collected on a filter, washed moderately with cold water, and dried at a temperature below 212°. When dry, it is reduced to powder, and rubbed up with cold water. Diluted muriatic acid is now added by degrees. The first portions are speedily neutralized, but fresh acid is added until a slight but permanent excess is present. This dissolves both the morphia and narcotine, forming a dark-brown solution, which must be filtered to separate it from some very dark matter which is left undissolved. The filtered solution is now evaporated to nearly the consistence of syrup, and on cooling forms a brown mass of crystals moistened with a very dark liquid. The whole mass is now subjected to strong pressure between folds of bibulous paper, which absorbs the liquid containing the muriate of narcotine and colouring matter, and leaves the muriate of morphia tolerably pure, although still of a brownish colour. A second solution, crystallization, and expression, yields the salt nearly white and free from narcotine. By a third crystallization the muriate of morphia may be obtained in radiated bunches of silky crystals of snowy whiteness. These crystals, when dried by a moderate heat, become quite opaque. They are soluble to almost any extent in boiling water. Their solution has a very bitter taste, and yields, when supersaturated by ammonia, a highly crystalline precipitate of morphia. A similarly pure solution of narcotine in muriatic acid gives a curdy precipitate not at all crystalline.

The quantity of muriate of morphia obtained from opium by the above process varies according to the quality of the drug. From a very pure specimen of Mr Young's British opium I obtained 13.5 per cent of nearly pure salt in one of the first experiments I made. I have no doubt there was here considerable loss. On the other hand, from an equally pure specimen of East India opium, I obtained only 4.5

per cent. Here also I believe a good deal was lost*. The average amount I have hitherto obtained from good Turkey opium is from 10 to 11 per cent, quite pure. A great loss is sustained in the purification. Thus, in the experiments which yielded the above average quantity, the amount of the impure salt obtained by the first crystallization, which had only a fawn colour, was always from 13 to 15 per cent. From a beautiful specimen of Turkey opium, I even got 17.5 per cent of the impure salt. In all cases, the salt was dried by a heat of 150° F. until it ceased to lose weight, before its quantity was ascertained. In the repeated processes of expression, much muriate of morphia is absorbed by the paper along with the muriate of narcotine, and it may even be again recovered from the paper. I am at present engaged, along with my friend Dr Montgomery Robertson, in endeavouring to purify the muriate with a smaller loss, and we have good hopes of the result. But, taking the quantity of pure muriate obtained at 10 per cent, that is, about twelve drachms from the pound avoirdupois, this is incomparably the cheapest preparation of morphia having any pretensions to purity. The acetate used in this country, and the sulphate employed in France, are made, or should be made, by combining crystallized morphia with the acids. But, to obtain the morphia crystallized, a quantity of alcohol must be employed, which, in this country at least, enhances very much the expense of the preparation; and it is this expense which the above process will obviate, as no alcohol whatever is employed.

Since making the experiments which have led me to recommend the process here described, I have observed that MM. Henri and Plisson had previously published one in some respects similar, founded on the *insolubility* of narco-

* According to my experiments, and those also of Dr Christison, East India opium appears to contain little morphia, but abundance of narcotine. The very dark colour of this opium coincides with an observation I have frequently had occasion to make, that narcotine and the resinoid colouring matter of opium adhere very strongly together, and are often found associated.

tine in muriatic acid, when very much diluted. They advise that the opium be digested at a temperature between 90° and 104° in diluted muriatic acid,—that the infusion be precipitated with ammonia, and the mother-water acidulated, concentrated, and precipitated again with the same reagent;—that the impure morphia thus procured be next dissolved with successive portions of very dilute muriatic acid, till there is a faint excess, by which the narcotine is left, and the solution subsequently evaporated and crystallized;—that the muriate of morphia be lastly washed with a little water, and purified by animal charcoal and crystallization, successively repeated twice or thrice, according to circumstances. They then direct the morphia to be precipitated by ammonia from a solution of the pure muriate made with a faint excess of muriatic acid*. The peculiarities of the process I recommend, which give it in my opinion a considerable advantage over that now stated, are, that in the first instance water only is used for preparing the infusion, by which less of the resinoid matter is taken up, while all the morphia is dissolved; and that instead of purifying the muriate of morphia by washing and the repeated use of animal charcoal, both of which steps involve a considerable loss, and cannot entirely remove the narcotine, I accomplish the same end more economically, by simple expression and crystallization. To the loss sustained by repeated washing and digesting with charcoal, and not, as MM. Henri and Plisson imagine, to mere inferiority in the sample of opium they used, I am inclined to ascribe the small proportion of morphia procured by their process,—amounting, in fact, to no more than 6½ per cent.

Not only is the acetate of morphia, the salt usually employed in this country, a very expensive preparation; it is also a very impure one in many cases. The strongest proof I can give of this is, that a quantity of acetate of morphia is said to be prepared in Glasgow, for the London market,

* *Journal de Pharmacie*, xiv. 252. 1828.

from the refuse or marc of laudanum. Now, when the laudanum has been properly prepared, I find that the marc contains no morphia, but a good deal of narcotine; and the French chemists are aware of this, so that they have recommended to extract the narcotine from the marc by means of acetic acid. Even if the opium used for laudanum be imperfectly exhausted, which is no doubt sometimes the case, any morphia which may remain in it must be strongly charged with narcotine, and hence unfit for internal use. It is impossible, except on the supposition of impurity, to account for the frequently unsatisfactory results, in this country, of the administration of remedies so well established abroad as the salts of morphia.

Lastly, the muriate of morphia seems to me to keep perfectly, whether dry or in solution.

At present, as the salt is only made by chemists on a small scale, its price may appear to some a sufficient reason for preferring the other preparations of opium, though less efficacious and salutary in their action. This objection, however, will be completely removed as soon as the chemical manufacturer shall prepare it on a large scale. The wholesale price of an avoirdupois pound of average opium,—which according to my experiments will yield an ounce and a half Troy of extremely pure muriate of morphia, and on a large scale, probably a drachm or two drachms more,—has been for the last two years, on an average, twenty-five shillings. If we add twenty-five per cent to this for expense of process and profit to the manufacturer, which is sufficient for an article that must cost very little in apparatus or materials, there will be procured an ounce and a half for thirty-one shillings and three pence; and this quantity makes, according to the experiments of Dr Christison and others, 2880 full doses.

Let us now compare the expense of this preparation with that of laudanum and the sedative solution of Battley. For Battley's solution the manufacturer charges the exorbitant wholesale price of twenty shillings per pound avoirdupois. Now, its medium dose, according to the experience of many

practitioners here, and especially that of the physicians of the Infirmary, being twenty-five minims, and its density almost exactly that of water,—a pound avoirdupois, that is 7000 Troy grains, or 7375 minims, will give only 295 doses. The expense of a dose of Battley's solution is therefore six times that of a dose of muriate of morphia.

By a similar calculation, it may be proved that the muriate of morphia will be even somewhat cheaper than common laudanum. To convert an avoirdupois pound of opium into laudanum, the Edinburgh Pharmacopœia directs it to be infused with twelve pounds of proof spirit, which is made with equal parts of water and alcohol of 835 density. Now the wholesale price of alcohol of this strength being in Scotland eleven shillings the gallon, and the gallon containing 8.35 avoirdupois pounds of such alcohol, the six pounds required to convert a pound opium into laudanum cost nine shillings and two pence. So that a pound of opium, made into laudanum by the Edinburgh process, costs the apothecary thirty-four shillings and two pence. The quantity of laudanum procured is about a twelfth less than the amount of proof spirit used, that is eleven pounds,—a portion being retained by the mass of opium, however well squeezed. As the density of the laudanum is 920, the eleven pounds will give 87087 minims. According to the experience of many professional friends here, a full dose of laudanum is at least thirty minims. Hence for thirty-four shillings and two pence there is procured 2903 doses.

Expressing these data in simpler terms, it appears that for twenty shillings the apothecary should receive 295 doses of Battley's solution, 1700 doses of laudanum, and 1840 of muriate of morphia. The muriate of morphia is at once, then, cheaper and more efficacious than any of the preparations of opium now in general use.—*Edin. Med. and Surg. Journ.* April 1831.

ART. XVI.—*On the Analysis of Elaterium, and its active principle. By John D. Morries, Esq. Member of the Royal Medical and Plinian Societies of Edinburgh.**

THE great uncertainty of the effects of Elaterium as a cathartic, and the probable dependence of this uncertainty on original differences in the quality of the drug, as well as on the occasional addition of impurities, render it an object of much consequence to determine what is its active principle, and how this may be separated in a pure state. Several attempts have already been made to attain this object,—among which it is only necessary for me to particularize the analysis of Dr Paris, first published in 1822. According to this analysis the active principle of elaterium, which he terms *Elatine*, is a green, soft, inflammable matter, free of bitterness, insoluble in water, and soluble in alcohol and the alkalies. The action of this substance as a medicine was so violent as strongly to favour the idea of its being the active principle. But a variety of circumstances tend to throw doubt over the accuracy and completeness of Dr Paris's analysis. Among these, it might be sufficient perhaps to observe, that he operated on so small a quantity as ten grains only of elaterium,—a quantity which could scarcely be expected to yield satisfactory results. But besides, in the physical and chemical characters of the substance procured by Dr Paris, the chemist must recognize a close resemblance to chlorophylle, and certainly no analogy with the active principles which have been discovered both before and since

* In some of the London weekly journals, published on the 12th February, the discovery of a crystalline principle in Elaterium has been announced as made by a Mr Hennell of the Apothecaries' Hall there. In reference to this announcement, we have authority for stating, that the principle discovered by Mr Morries, which is probably the same with that found by Mr Hennell, was put into the hands of Dr Christison early in November, and mentioned a day or two afterwards to various persons in Edinburgh. His paper was read before the Royal Medical Society on the evening of Friday the 4th of February.—*Editors of Ed. Med. and Surg. Journ.*

in almost every plant possessing an action on the animal body.

On repeating Dr Paris's experiments on the same quantity which he employed, I found results differing materially from his. Of ten grains of apparently good elaterium he found four soluble in water;* but on repeating this, I found that water only dissolved two grains and nine-tenths. Of the six grains insoluble in water, he found only five-tenths were dissolved by alcohol;† while I found that alcohol took up two grains and two-tenths.

These discrepancies of result must have arisen from the very great difference which prevails, as will presently appear, between various specimens of elaterium. But on proceeding with the analysis, I remarked other more important differences.

When fifty grains of good elaterium were digested for twenty-four hours in distilled water at a temperature of about 200° F. they were found to have lost eleven grains. The infusion was of a light brown colour, and an austere bitter taste, and appeared to contain a minute portion of gum, but no starch. On standing for some time, a few crystals of lime were deposited. The residual quantity, amounting to thirty-eight grains (one grain having been lost by adhesion to the filter, and other unavoidable circumstances), was acted on by alcohol, s. g. 825, and was found to have lost ten grains. The alcoholic tincture was of a deep green colour, and a bitter, somewhat acrid, taste. On being evaporated to the consistence of oil, and allowed to cool, numerous masses of small spicular crystals were observed; these were separated, washed with sulphuric ether, and dried. The rest of the extract was boiled in *aqua potassæ*, to free it from the elatine or colouring matter (terms I consider as synonymous), which is soluble in alkalies. After standing for a few minutes, a small quantity of white crystalline matter fell to the bottom of the flask. The supernatant fluid was now decanted, and the crystals collected on a filter, and

* Pharmacologia, p. 203. Exp. A.

† Ibidem, p. 204. Exp. D.

washed with sulphuric ether, to free them more completely from adhering colouring matter.

Having obtained an appreciable quantity of crystalline matter, I proceeded to examine its properties.

It is, as I have already stated, a white crystalline substance of an extremely bitter and rather styptic taste; insoluble in water and the alkalies; soluble in alcohol, ether, and in hot olive oil; sparingly soluble in dilute acids. When procured in a state of purity, as by the process to be described presently, it forms microscopic rhombic prisms, striated on the sides, possessed of considerable lustre, and of a silky appearance when in mass. It is decomposed by the strong acids, forming with nitric a transparent yellowish gummy-looking mass, and with sulphuric, a solution of a deep blood-red colour, which I should rather think caused by adhering colouring matter. It is fusible at a temperature a little above that of boiling water, and at a higher temperature is dissipated in thick whitish pungent vapour, having rather an ammoniacal odour.

Considering this substance as the proximate principle of *elaterium*, I first named it *elateria*; but as its alkaline reaction is not by any means distinct, and it does not appear to exist in the crude drug in the form of a salt, as every one of the acknowledged alkaloids does,—I have since altered it to *Elaterine*.

The process which I at first followed for procuring elaterine was that of washing the small crystals above-mentioned with sulphuric ether; this I found unmanageable, as the sulphuric ether dissolves both the elaterine and colouring matter with great facility.

The next process I tried was by boiling the alcoholic extract in *aqua potassæ*; this also I found inconvenient and troublesome. The process I now follow is simple and economical. The alcoholic tincture is to be evaporated to the consistence of thin oil, and while still warm, is to be thrown into boiling distilled water; immediately a copious white crystalline precipitate falls, and increases in quantity as the liquor cools. This precipitate is the elaterine, the elatine

remaining in solution. The elaterine is then to be separated by decantation and filtration, and repeatedly washed with distilled water. In this state it is sufficiently pure for ordinary purposes and for medical use. If it be required perfectly pure, it is only necessary to repeat the solution in alcohol and precipitation.

I would propose the same process for all vegetable crystallizable principles insoluble in water, as the separation from colouring matter is more complete after one precipitation than after repeated crystallization from alcohol in the ordinary method. I have tried it with strychnia, and found it completely successful. When cold water is used, the crystals are smaller, and do not possess lustre.

The following table gives a view of the different solubility of different specimens of elaterium, first in water, and then in alcohol, and of the quantity of elaterine contained in each :—

Grs.	British Elaterium.	Soluble in water.	Soluble in alcohol.	Quantity of Elaterine.
200	No. 1,	53	44	30
	2,	50	43	Not estimated.
	3,	44	46	40
	4,	46	45	36
	5,	52	63	52
<hr/>				
Grs. French Elaterium.				
200	light colour.	94	17	Not correctly estimated.
	dark colour.	140	20	

The best specimen of the British elaterium contained nearly 26 per cent of elaterine, and the worst, No. 1. about 15. The French elaterium, which I obtained through the kindness of Dr Duncan, did not appear to contain above 5 or 6 per cent. There is obviously, therefore, an extreme difference in the strength of this drug in its crude state; so that it ought never to be administered in that form, especially considering that its active principle may be procured by so simple a process.—*Edin. Med. and Surg. Journ.* Ap. 1831.

ART. XVII.—On Oxamide, a substance which approximates to some animal Bodies.—(M. Dumas.)

THIS substance is produced whenever oxalate of ammonia is distilled, and the name *oxamide*, or *oxalamide*, is given to it provisionally, as indicating that it is formed of oxalic acid and ammonia, and by particular treatment can reproduce these bodies. When acted upon by potash, it yields 36 per cent of ammonia, though it contains none: by the same treatment it can produce 82 per cent of oxalic acid, and yet includes none of that body. These curious properties associate oxamide with the phenomena which occur when animal substances are made to yield ammonia by the action of alkalies, and also with those new observations due to MM. Vauquelin and Gay Lussac, on the development of oxalic acid, when organic matters are acted upon by potassa.

When oxalate of ammonia is distilled, it first loses water; the crystals become opaque; then, where close to the heat, fuse, boil, are decomposed, and disappear without any change occurring in the more distant parts of the mass. Ultimately, a little carbon remains, but nearly the whole has been volatilized. The water which has passed over into the receiver contains a flocculent substance; a thick deposit of a dull white matter also lines the neck of the retort; both these are oxamide. To isolate it, the whole is diffused in water, filtered and washed, the peculiar substance remains in the filter, 100 parts of the oxalate of ammonia yield 4 or 5 of oxamide; the other products are ammonia, water, carbonate of ammonia, carbonic acid, oxide of carbon, and cyanogen.

Oxamide occurs in imperfectly crystallized plates, or as a granulated powder. When well washed and pulverized, it is a dirty white powder, looking like uric acid, having no taste or odour, and not affecting test papers. Heated carefully in an open tube, it volatilizes; heated in a retort, part sublimes, whilst part is decomposed, yielding cyanogen and

a very bulky, light charcoal remains. It is scarcely soluble at common temperatures; a saturated solution at 212° F. deposits confused crystalline flocculi of the unaltered substance.

As oxamide, is an azoted substance, the ratio of the azote and carbon to each other was first ascertained by combustion with oxide of copper in a glass tube. In this mode of analysis, M. Dumas points out the necessity of collecting the *whole* of the gas evolved, and ascertaining its composition. Portions of the gas often differ from each other; and if the composition of the whole be deduced from these portions, great errors may occur. In experiments on the oxamide, two volumes of carbonic acid were produced for each one of azote, so that the carbon and the azote are in the same proportion as in cyanogen; 100 parts of oxamide gave 26.95 carbon, and 31.67 azote.

When oxamide was heated with great excess of concentrated sulphuric acid, it yielded a mixture of carbonic acid and of carbonic oxide gases in exactly equal volumes; no cyanogen was formed: this is precisely what takes place with oxalic acid. When the sulphuric acid was diluted and saturated with potash, much ammonia was evolved, so that a sulphate of ammonia had been formed. In this way, therefore, oxamide is resolved into ammonia, carbonic oxide, and carbonic acid.

When oxamide was heated for some time with strong solution of potassa in great excess, much ammonia was disengaged. The potash, afterwards neutralized by nitric acid, was found to contain oxalate of potassa, so that potassa evolves oxalic acid and ammonia from oxamide, and those substances only.

These results created a suspicion, that oxamide was to oxalate of ammonia what pyrophosphoric acid is to the ordinary phosphoric acid. The substance, therefore, was compared to oxalate of ammonia, supposed to be dry, both by theory and experiment. The carbon is to the azote as 2 proportionals to 1 in both compounds; but 100 parts of oxa-

mide contain 26.95 of carbon, and 31.67 of azote, whilst 100 parts of dry oxalate of ammonia contain only 22.6 of carbon, and 26.6 of azote. When 100 parts of oxamide were converted by potash and sulphuric acid into the elements of oxalate of ammonia, they gave products amounting to 120 parts, i. e., 26.95 carbon, 31.67 azote, 54.70 oxygen, and 6.3 hydrogen = 119.62. Now, the sulphuric acid and the potash could neither of them give carbon or nitrogen, but might communicate oxygen and hydrogen from the water present with them: withdrawing 19.62 of these elements in the proportion to form water, there remains the following composition as nearly as may be:—

4 vols. carbon	27.08
2 — azote	32.02
2 — oxygen	36.36
4 — hydrogen	4.54

100.

Oxamide may, therefore, be considered at pleasure as a compound of cyanogen and water; or as a compound of deutoxide of azote, and bicarburetted hydrogen; or as a compound of oxide of carbon and a hydruret of azote, different to ammonia. Whichever way it be viewed, if 2 volumes of vapour of water are added to it, dry oxalate of ammonia is produced; and it is in this way, apparently, that sulphuric acid and potassa act.

In conclusion M. Dulong remarks, that many animal matters, as albumen, gelatine, fibrine, &c., act with potassa as oxamide does. Uric acid approximates to it: hippuric acid also resembles it. All these bodies have properties in common with it so characteristic, that M. Dulong has been induced to commence an experimental comparison of them with this new substance.*—*Journ. Royal Instit.* Feb. 1831.

* Ann. de Chimie, xliv. 113.

ART. XVIII.—*On the Distillation of Nitric Acid.* By E. Mitscherlich.

DURING the decomposition of nitre by sulphuric acid, there are some circumstances regarding the combination of the acid with the potash of the nitre, which have hitherto been but little attended to. Of the three compounds of sulphuric acid and potash with which we are acquainted, the sulphate and bisulphate only require our consideration with respect to the above process, the former of which is sufficiently known; the bisulphate contains twice as much acid as the sulphate; and water, the oxygen of which is to that of the acid as one to six; this water is very fixed, and is not even evolved during the fusion of the salt at 392° F., but only when the salt itself is decomposed; a property which the latter has in common with the sulphate of the protoxide of iron, and some other salts. It would accordingly, perhaps, be better to consider the bisulphate of potash as a compound of the hydrate of sulphuric acid and the sulphate of potash: it consists of 58.80 sulphuric acid, 34.61 potash, and 6.59 water.

If equal parts of the nitrate and the bisulphate of potash be distilled with half a part of water, until the emission of red vapours begins, which is the case at about 418° F., the water in the receiver will be found to contain not more than $1\frac{1}{2}$ per cent acid of the nitrate employed; and it accordingly is evident that the bisulphate and the nitrate commence only to act on each other at that temperature. On increasing the heat; the retort becomes filled with red vapours; oxygen is evolved and nitrous acid distills over, and is dissolved by the aqueous nitric acid in the receiver. The emission of red vapours continues when the retort is red hot, and it appears consequently, that even at so high a temperature a large quantity of the nitrate is left undecomposed by the bisulphate.

If the quantity of sulphuric acid employed be just sufficient to produce the sulphate, the temperature required for

the distillation of the acid does not exceed 302° F.; after half the quantity of the acid in the nitrate has been distilled over, the residue consists of bisulphate and nitrate of potash which, on increasing the temperature, act on each other in the manner above described—viz., oxygen and nitrous vapours are evolved and the liquid in the receiver is coloured by nitrous acid. The quantity of water employed in the process is quite indifferent, and influences only the strength of the distilled acid, which, previous to increasing the heat above 302° F., is perfectly colourless. According to this process, that is to say, where the quantity of sulphuric acid is 48.41 to 100 of the nitrate, the quantity of nitric acid produced does not exceed six-sevenths of that previously contained in the nitrate.

Nearly the same result is obtained by distilling 100 parts of nitre with 72.6 of sulphuric acid; but in this, as well as in the last process, a very great heat is required to decompose the last proportions of nitre, part of the acid of which will, moreover, also be found to be lost. But if, with 100 parts of nitre, 96.8 parts of acid are used, so that the bisulphate of potash is formed, the process will be found to be far more profitable, for none of the acid is lost; distillation takes place very easily, and at a heat not exceeding 248° to 257° F.; the nitric acid obtained is of 1.512 gravity, which by distillation may be increased to 1.54. The former which is colourless, contains 86.17; the latter is rather yellowish, and holds 88.82 per cent of acid.

If water is added to the acid of 1.522, the boiling point of the liquid gradually rises; and, on distillation, first concentrated and then weak acid will be found to pass over. This continues, however, only until the quantity of water amounts to 44 per cent of the acid, the specific gravity of which is then 1.40, and the boiling degree between 248° and 249° F.; if the quantity of water is still increased, the boiling point falls, and the order of the distillation is, as it were, contrary to what it was observed before—viz., first weak and then strong acid is obtained. This likewise takes place during the distillation of nitric acid from nitre; for if, with 100 parts of nitre and 96.8 of sulphuric acid, the quantity of water is

not equal to 44 per cent of the acid formed, the first produce of distillation is strong, and the next diluted acid; if more water is employed, the contrary takes place.

It is, accordingly, most advantageous to use 100 parts of nitre, 96.8 of sulphuric acid, and about 40.45 of water, which will be sufficient, as the nitrate of potash always contains some water; and the sulphuric acid is seldom so concentrated as to contain less than $18\frac{1}{2}$ per cent. The acid distils at 266° F., and its specific gravity is between 1.4 and 1.395. 28 lbs. of purified nitre, with $13\frac{2}{10}$ lbs. of sulphuric acid, of 1.85, yielded 34 lbs. of nitric acid, of 1.30 specific gravity; and the same quantity of nitre, with $27\frac{1}{2}$ lbs. sulphuric acid, gave $37\frac{7}{8}$ lbs. of nitric acid, of 1.30*. Besides, the first process required almost twice as much fuel and much more time than the second.

In conclusion, M. Mitscherlich mentions some remarkable properties of nitric acid, of 1.522 specific gravity. Iron, tin, and several other metals, may be put into, and even boiled in it, without the least effect; whilst zinc is immediately oxidized and dissolved.†—*Journ. Royal Instit.* Feb. 1831.

ART. XIX.—*On the Volatility of Oxalic Acid.* By Edward Turner, M.D. F.R.S. L., & E., Sec. G.S. Professor of Chemistry in the University of London.

THE object of this notice is to communicate a few facts respecting the volatility of oxalic acid. It is stated in chemical works, that when this acid is exposed to the destruc-

* According to Thénard, from 100 parts of nitre and 66 2-3 of sulphuric acid, 43.8 of very strong nitric acid, and from the same quantity of nitre with 144 parts of sulphuric acid, 81.6 parts of nitric acid of the same strength were obtained. These results appear to M. Mitscherlich to be erroneous.

† Poggendorff's *Annalen*.

tive distillation, part escapes decomposition and is sublimed, being deposited as a white sublimate in the neck of the retort; but whether this appearance is owing to real volatility, or is an instance of that spurious kind of sublimation, exemplified in the ascent of boracic acid along with aqueous vapour, and in the removal of fused chloride of silver when a current of hydrogen gas is passing rather rapidly over its surface, does not seem to have been fully determined. Oxalic acid, in consequence, is not generally regarded as volatile, except at a temperature sufficiently high for producing its decomposition.

Having been accidentally led to investigate this point, I found that oxalic acid may be sublimed at a very moderate temperature, even so low as 212° Fahr., without undergoing any chemical change, except that the common crystals lose two-thirds, corresponding to two equivalents, of their water of crystallization. When 63 parts of the common crystals are placed in a water-bath, efflorescence rapidly ensues, and 17.31 parts, somewhat less than two equivalents, of water are expelled. If the-effloresced mass is then removed from the fire and exposed to the air, it speedily recovers from the atmosphere precisely the quantity of water which it had lost; but if it be still kept in the water-bath, the surface of the acid, instead of remaining pulverulent, becomes covered with numerous minute acicular crystals, and an acrid vapour rises, which condenses on cold surfaces in the form of needles. This vapour is accompanied with a small quantity of moisture, which completes the two equivalents of water required to be withdrawn, in order to constitute the sublimed acid.

The sublimation of oxalic acid at 212° , though sufficient both to occasion loss in analysis, and to establish the fact of volatility, is too slow for affording a supply of the sublimed acid. A convenient process for this purpose is the following: About half an ounce or an ounce of oxalic acid, purified by repeated crystallization, is dried in a rather deep evaporating basin, exposed on the sand-bath to a temperature

of about 350° or 400° Fahr.: as soon as sublimation commences, the vessel should be covered with a layer of smooth filtering paper, on which is laid a fold of common blotting-paper, and both are pressed tight upon the edge of the basin by means of another and somewhat larger capsule, placed with its convexity downwards, and containing cold water or ice. During this rapid sublimation some of the acid is decomposed, and the water derived from this source is absorbed by the coarse outer fold of paper; while the acid is condensed on the smooth paper below, and gradually falls down upon the sides of the dish. At intervals of about an hour the apparatus should be removed from the fire, and the sublimed portions, while still warm, be brushed away with a feather, and quickly secured in a well-stopped bottle.

Sublimed oxalic acid, as thus procured, is commonly in the form of minute shining acicular crystals; but I have occasionally obtained it in slender prisms half an inch long, possessed of considerable lustre and transparency. On exposure to the air it becomes dull and opaque from the absorption of moisture, 45 parts or one equivalent of the sublimed acid rapidly acquiring two equivalents of water, and thus regaining its original constitution. This water is again completely expelled by a temperature of 212°. The vapour of the acid is very pungent, exciting cough and sneezing more readily than the fumes of nitric or muriatic acid.

Sublimed oxalic acid rises slowly, as already mentioned, at 212°. As the temperature increases, the sublimation becomes more rapid; and if the heat does not exceed 300° or 330°, the acid sublimes entirely without decomposition. At 360° the sublimation is very free; between this point and 400° it sublimes rapidly; and at 414° it fuses and enters into brisk ebullition. At temperatures exceeding 330° more or less of the subliming acid, as the heat is more or less intense, suffers decomposition; a change immediately indicated by the appearance of water.

The facts already mentioned leave little doubt of sublimed

oxalic acid consisting of 36 parts or one equivalent of the anhydrous acid, and 9 parts or an equivalent of water. . The correctness of this opinion was proved by analysis, the oxalic acid being precipitated with lime, and its quantity inferred in the usual manner by decomposing the resulting oxalate of lime. The sublimed acid, also, is readily decomposed by concentrated sulphuric acid, yielding abundance of gas, which consists of exactly equal measures of carbonic oxide and carbonic acid. When neutralized with potash and ammonia it yields crystals similar to the well-known oxalates of those alkalies ; and the crystals, obtained from a solution of the sublimed acid in pure water, were measured by Mr Miller of St John's College, Cambridge, and found identical with the crystals of the common acid. These facts leave no doubt concerning the nature and constitution of the sublimed acid.

Before concluding this notice, I may add a few remarks on the solubility of ordinary oxalic acid in water, concerning which the statements of different authors are very discordant. The solvent power of water increases rapidly with the temperature. A hot solution of oxalic acid was set aside for twenty-four hours, when the clear liquid, kept at the temperature of 50° Fahr., was decanted from the crystals which had been deposited. This solution consisted of one part of crystallized acid and about 15.5 of water. The experiment was repeated by putting the pulverized crystals into water at 50°, agitating repeatedly during twenty-four hours, and then decanting the solution from the undissolved acid. The ratio of the ingredients was almost exactly the same as that above stated. Similar observations were made with water at 57° Fahr., of which 9.5 parts dissolve one of the crystallized acid.

Crystallized oxalic acid dissolves in almost an unlimited quantity in water kept at 212° by immersion in boiling water. If the acid solution is kept boiling by the direct application of fire, the temperature rises considerably above 212°, and the quantity of the crystallized acid dissolved is

then unlimited. This is not surprising; since the crystals fuse in their water of crystallization at about 220° Fahr.

I may also add the following observations on the degree of permanence of crystallized oxalic acid. When the crystals are kept for some hours under a bell-jar, with quicklime, at a temperature not higher than 50° or 55°, they contain all their water of crystallization, consisting of one equivalent of real oxalic acid and three equivalents of water. If then exposed to a damp air, they increase slightly in weight by absorbing water hygrometrically, and its extent varies with the humidity of the atmosphere. In dry air at 70° Fahr. the crystals lose some of their water of crystallization, and effloresce on the surface. The efflorescing temperature is thus very little above the ordinary heat of summer.—*Philos. Mag. &c.* March 1831.

ART. XX.—*Method of obtaining Volatile Oils in Organic Analysis.* By M. Bonastre.

THE difficulty of obtaining certain volatile oils, which are met with in very small quantities in organic substances, submitted to analysis, is one of the principal causes, why these products are not always detected in articles in which they naturally exist. This difficulty is still greater, when substances such as the gum resins, &c. which independent of tenacious resin, also contain gummy albuminous or extractive matters, and are susceptible of thickening or even coagulating by the action of water and heat. In this latter case, it is absolutely impossible to obtain the volatile oil by the usual plan.

The result of this condition of things is very unsatisfactory.

1. From not being able to detect the new product, where it

really exists; and 2. The erroneous explanation it gives of certain chemical phenomena, which are liable to be attributed to other components.

Having occasion in 1829 to institute a comparative analysis of true myrrh, and of a new species which I term false, I soon perceived that the only *chemical* difference that existed between them was, that the first became of a rose, red and claret colour on the addition of nitric acid, which change did not take place in the second. Guided by my first experiments on the colouring of volatile oils by nitric acid, I thought that this change in the myrrh could only have arisen from the action of the acid on one of its special principles, and that this principle must be a volatile oil in the true myrrh.

In submitting the new species of myrrh to an analysis, I was struck with the extreme difficulty that I experienced in abstracting the volatile oil, and which I was only able to effect in a very imperfect manner.

Convinced that this difficulty was owing to the kind of gum contained in the myrrh, which swells considerably by the action of water and heat, I thought that I might arrive at more certain results by adopting an opposite procedure.

For this purpose, I procured eight ounces of true myrrh, in a single piece, that there might be no admixture. I reduced it to very small fragments, and introduced it into a matrass with an equal proportion of rectified alcohol. I shook this mixture often to aid the solution and decanted it at the end of six days. To the residue I added an equal quantity of alcohol and again decanted it in ten days. Finally, after a third addition of six ounces of alcohol and six days of maceration, I united the three tinctures, filtered them, and poured them into a tubulated retort.

I kept the retort in my hand for some time, the heat of which was sufficient to occasion the extrication of some alcoholic vapour, which condensed in the neck of the retort. I received the condensed fluid in a receiver full of water, and

was not a little surprised to find the water become turbid and milky. There was hence no doubt, that the alcohol was charged with volatile oil. I placed a thermometer in my hand; and found that the volatilization of the alcohol took place at 86° and its condensation at $53\frac{1}{2}^{\circ}$ only.

I thought that a heat of 86° was too great, since the volatilization of the alcohol, charged with volatile oil, had immediately taken place; I therefore endeavoured to diminish it, and left the tincture to evaporate slowly by the action of the air, in a tubulated retort with the stopper withdrawn. This operation lasted ninety-five days, during which the temperature was never less than $53\frac{1}{2}^{\circ}$ above 0, and never exceeded $67\frac{1}{2}^{\circ}$. After this time the alcohol was entirely evaporated and the residue was reduced to a blackish resinous mass of the consistence of Briancon turpentine. I then poured a sufficient quantity of water into the retort, and twelve hours afterwards carefully distilled it. The first vapour that condensed was much charged with volatile oil, which ran down into the recipient in the form of small globules, and floated on the surface of the water. I thus obtained all the volatile oil contained in the true myrrh. The residue formed a dry, friable resin, and a thick, compact extractive matter, very difficult to remove from the retort after cooling. The volatile oil of myrrh is fluid, lighter than water, of a light-amber colour, of a bitter and very acrid taste, and having a strong smell of myrrh. I obtained about eighteen to twenty drops: my principal object, however, is to prove the possibility of abstracting volatile oils contained in the soluble resins which form a constituent part of the gum-resins; for it is exceedingly probable that it is only in fluid resins of this kind that volatile oils naturally exist.

It is very likely that many other volatile oils may be obtained by this procedure. Thus senna, opium, rhubarb, jalap and other substances which are characterized by peculiar odours, owe these perhaps to volatile oils analogous to those of myrrh, but intimately mixed with various organic

products, from which they must necessarily be separated before proceeding to extract them by distillation.

From the above it may be concluded that the success of this plan of procedure consists,

1. In dissolving, by means of cold alcohol, the soluble principles supposed to contain the volatile oil.

2. In gently evaporating the alcohol charged with those principles at a low temperature.

3. In pouring pure water on the residue or liquid resin, and distilling the whole with caution in a retort.—*Journal de Pharmacie. Feb. 1831.*

ART. XXI.—*Sulphuric Ether.*

THIS substance is prepared in the royal laboratory at Berlin in the following manner.

11. kil. 710 sulphuric acid and 6 kil. of alcohol (0.835) are to be mixed together, and poured into a tubulated retort of about a foot in diameter. In the tube is to be fixed a glass tube bent at a right angle; the shortest leg of this tube is to enter the retort, and to reach about an inch below the surface of the fluid. To the other end, which should be about two to three feet long, is to be attached a tin tube from four to six inches long, which is to be furnished with a stop-cock. This tube is to be adapted by means of a perforated cork to a flask containing alcohol, which at a later part of the process is to reach the retort. It is better to cut the glass tube near the angle and to join the two pieces by means of a gum elastic tube, this renders it more manageable and less liable to accidents. The retort is now to be placed in a sand-bath, and covered as high as the fluid reaches, and a Gedda's small condenser or common worm surrounded by cold water adapted to it. The only part to

be luted is where the neck of the retort joins the condenser or worm. The liquid is now to be heated to ebullition, and by opening the stop-cock, a quantity of alcohol equal to the impure ether which distils over is to be permitted to run into the retort; in order that there may be no variation in the volume of the fluid in the retort, its height is to be marked by a band of paper, &c. The addition of the alcohol is to be continued, till 52 kil. have been employed, or about five times as much as the sulphuric acid.

A larger quantity would weaken the acid too much. This process lasts about 18 to 20 hours, and the operator is never subjected to any accident. When properly conducted it will afford 62.5 pounds of ether to the 100 of alcohol.

At the commencement of the distillation, water and ether pass over; at a later part of the process, however, where the acid is weakened this double product is not formed. The impure ether is a mixture of ether, alcohol, water, sulphurous acid, acetic acid, and oil of wine, and is to be rectified in a copper still, having been previously mixed with an equal bulk of water, and a small quantity of whiting or calcined magnesia. When the ether which passes over has a sp. g. of 0.72, it is almost certain that it contains no oil of wine; about one third of pure ether is obtained by this rectification, after which the impure ether comes over, then the alcohol containing much oil of wine, and lastly the water also mixed with oil of wine. These products are again to be submitted to distillation.—*Journal de Pharmacie. Feb. 1831.*

ART. XXII.—*Effects of Animal Charcoal on Solutions.*
By Thomas Graham, A.M., F.R.S.E., Lecturer on Chemistry, Glasgow.

THE property of withdrawing matters from a state of solution, possessed by the charcoal of bone-black, has been investigated in the case of soluble colouring matters of a vegetable and animal origin. It is known, that the discolouring faculty resides entirely in the charcoal, for the earthy matters and portions of azote combined with it possess by themselves no such power, and the charcoal discolours without them. This property is also greatly exalted by the state of extreme division and porosity of animal charcoal, arising from the interposition of foreign particles of earthy and saline matter between the particles of carbonaceous matter in bone, which effectually prevents the aggregation of the carbon during calcination. The bright, hard charcoal from the calcination of dried blood has no discolouring power; but the charcoal from the calcination of dried blood, mixed with carbonate of potash, as in the manufacture of prussiate of potash, proves the most efficient discolouring form of charcoal we possess, after the alkaline carbonate is washed out. A very intense heat, however, destroys entirely the discolouring power of bone-black.

The colouring matters are not destroyed or decomposed by the charcoal, but merely withdrawn from a state of solution, in combination with the surface of the charcoal, and may be again dissolved out and made to appear by the action of a more powerful solvent.

M. Lowitz first discovered this property of charcoal in 1791. He used only charcoal of wood. M. Guilbert observed, that the discolouring power of wood charcoal was improved, by exposing it for a considerable time in a wet state to the rays of the sun. In 1810, M. Figuier, Professor of Chemistry at Montpellier, discovered that animal charcoal discoloured with much greater power. It has subsequently

been used very extensively by the sugar refiners of France in clarifying their syrups. Of bone or ivory black, one sixth of the weight of the raw sugar is boiled with it for ten minutes. The charcoal and impurities are separated by filtering, and the syrup is filtered a second time to separate a little charcoal which comes through the first filter (Payen). In the *Journal de Pharmacie*, tom. iv., pp. 301—7, there is a distinct account of the mode of preparing bone-black, by M. Cadet de Gassicourt; and in the same work, tom. viii., pp. 257—277, an excellent memoir on charcoal, considered as a discolouring substance, by A. Bussy, which was crowned by the Society of Pharmacy of Paris, and contains every thing known on the subject. It is followed by another memoir on the same subject by M. Payen, to which a second prize was adjudged. The substance of the preceding memoir is given in this journal, vol. xiii., pp. 406—16.

But the action of animal charcoal on solutions has been considered hitherto only in reference to the removal of colouring matters. More determinate results, however, might be expected in solutions of saline and other chemical bodies, of which the composition is known. The investigation is also interesting, from the light which it may throw upon the state of combination in which bodies exist in cases of ordinary solution as salt in water, to which the doctrine of definite proportions seems wholly inapplicable. If a solid body, such as carbon, destroy such a combination and take down the saline matter attached to its surface, we may conclude that there is an analogy between the combination of the salt with the water, and the combination of the salt with the charcoal, and that the former as well as the latter processes have something of a mechanical character.

The same property is possessed by other solid bodies, in a state of minute division, as when newly precipitated, although not in so great a degree. And, in analytic researches, its interference must be guarded against, as it may contribute, in some cases, to increase the weight of precipitates.

The animal charcoal, employed in the following experi-

ments, was prepared from common bone, or ivory black, by boiling dilute muriatic acid upon it, and afterwards washing it with hot water till the water came off tasteless. No more than ten or twelve per cent of charcoal remained after dissolving out the earthy salts. On burning this charcoal, it left a gray ash, amounting to about one twelfth of the original weight, insoluble in water and acids, and almost entirely silica. Charcoal, prepared in this way, M. Bussy found to go no farther in discolouring than one and a half times its weight of the original ivory black.

In my first experiments, it was found that the prepared charcoal in great excess, had no sensible effect in impoverishing a saturated solution of common salt at natural temperatures. The proportion of salt remaining in solution was always as great as water was found capable of retaining, at the same time, at the lowest temperature which had occurred during the experiment.

A solution of nitrate of lead, with the charcoal repeatedly agitated, and occasionally tested with carbonate of soda, gave a distinct precipitate the first day, a much less distinct the second, and the merest trace the third day. But, on heating the water, the charcoal part of the nitrate was re-dissolved, and afforded a copious precipitate, with carbonate of soda and with sulphuretted hydrogen.

The dinitrate of lead, which is soluble, was taken down completely by the charcoal, so that no trace of it was perceived by means of sulphuretted hydrogen. But on heating the water over it to 200° , part was re-dissolved, as in the previous case, but again taken down completely by the charcoal on cooling. The action of the charcoal on the cold solution of the dinitrate was immediate, and much more energetic than in the case of the nitrate. The former salt, however, is much less soluble in water than the latter. Other soluble subsalts were tried.

2. Three grains diacetate of lead in one ounce water, with twenty grains common ivory black: taken down completely and not re-dissolved in any degree on boiling.

Four grains trisacetate of lead; same results.

Four grains tartar emetic in one ounce water, with twenty grains of the prepared charcoal, in the cold; agitated occasionally for several days; still a copious precipitate, with hyrosulphuret of ammonia. After a second addition of twenty grains of the charcoal, only a trace of antimony, with sulphuretted hydrogen.

Lime-water was deprived entirely of the lime which it contains, in the cold, as Dr Paris previously observed, so that the liquid remaining did not act on reddened litmus.

Arsenious acid was not taken down entirely in six weeks by great excess of the charcoal, no heat being applied.

No quantity of the charcoal could take down bisulphate of copper.

Ammonia was added in excess to bisulphate of copper, so as to form the deep-blue solution of ammonio-sulphate: the latter was readily taken down by the charcoal, and the liquid became perfectly colourless. Strong ammonia was digested in the cold upon the charcoal containing the salt of copper, and also boiled upon it, without dissolving a trace of it, as the ammonia did not become blue even when poured off and exposed to the air. In a certain experiment, the deep-blue colour of five grains bisulphate of copper in half an ounce of caustic ammonia, diluted with one and half ounces water, was much impaired by twenty grains of the charcoal. Increasing the charcoal every second day, by five grains at a time; with thirty-five grains, the colour had become very slight, and was entirely destroyed by forty grains; nor did the supernatant ammonia contain any protoxide of copper.

Five grains of nitrate of silver, in the same quantity of ammonia and water, with twenty grains of the charcoal. Next day no trace of silver in solution could be detected; two and a half grains nitrate of silver added; agitated occasionally with the charcoal, but after several days there was still silver in solution. On examining the phial containing the above materials some time afterwards, shining metallic spangles were perceived among the charcoal.

The solution of chloride of silver in ammonia was also taken down completely by the charcoal.

A solution was made of ten grains hydrated protoxide of lead in caustic potash, which was diluted with water till it amounted to three ounces. Twenty grains of the charcoal, added to the above solution, in a phial, which was then corked up, took down so much of the oxide of lead that the white colour of the latter substance was quite discernible among the charcoal. Here we have the colour of the charcoal disguised in the compound. Making successive additions of charcoal, the oxide of lead in solution was reduced to a trace by ninety grains; the last additions of charcoal floated over the heavy portion containing the oxide of lead; the supernatant solution, which had a greenish tinge, was poured off, and the charcoal washed, thrown on a filter, and dried at a heat which did not exceed 212° . When dry, innumerable metallic particles were visible in it; so that the oxide of lead is easily reducible by the charcoal attached to it.

The oxide of zinc was withdrawn entirely by the charcoal from solution in caustic ammonia.

A deep-red solution was made of five grains iodine in fifteen grains pure hydriodate of potash, dissolved in two ounces water. Forty grains of the charcoal were added before the colour of the iodine was wholly removed from the solution; the liquid acquired a faint acid reaction: the carbon was washed, and dried in a filter on the sandbath without exhaling iodine vapours; but on heating it strongly in a flask by a lamp, iodine rose in vapour, and condensed on the sides of the flask with some moisture. The iodine was afterwards re-absorbed by the dry charcoal when cold.

Labarraque's disinfecting fluid (chloride of soda with bicarbonate of soda) may be boiled without being materially injured; but I was surprised to find that ebullition for a few seconds of a large quantity of that fluid, in contact with a few grains of the charcoal, completely destroyed its bleaching power.

The same effect took place in the cold, on agitating the fluid and the charcoal together for a few minutes. No gas was emitted in either case. On evaporating the saline solution to dryness, it was found to contain no notable quantity of chlorate of soda. Twenty grains of carbon are adequate to destroy the bleaching power of a pint of the disinfecting fluid recently prepared.

A solution of common bleaching powder, chloride of lime, was destroyed by charcoal with nearly equal facility, particularly when hot.

A pound of water, recently impregnated with an equal bulk of chlorine gas, was heated rapidly to the boiling point, in contact with twenty grains of the charcoal, in a glass flask provided with a perforated cork and bent glass tube, for the purpose of collecting any gas which might be given off. Gas was collected, but it was entirely carbonic acid, and most of the charcoal disappeared: muriatic acid was found in the liquid. On collecting the unconsumed charcoal in this and other cases, and washing it several times after being dried on a sandbath, it gave out a few drops of strong muriatic acid, when heated in a glass tube by means of a lamp.—*Quar. Jour. of Science, &c. Jan. 1831.*

ART. XXIII.—*On the Mode of Ascertaining the Commercial Value of Ores of Manganese.* By Edward Turner, M.D., F.R.S. L. and E., Sec. G.S. Professor of Chemistry in the University of London.

THE analysis of the ores of manganese, when pure, is exceedingly simple. The operator need only, by well known methods, determine the water which the ore contains, and the oxygen which it loses in being converted into the red oxide. Its degree of oxidation, on which the commercial

value of ores of manganese so essentially depends, may then be readily inferred.

But when impurities prevail, as they almost always do, more or less, in commercial manganese, the analytic process is complex and troublesome; and the presence of iron, which is rarely absent, renders an exact result by the ordinary modes of analysis almost impracticable. For, as I have elsewhere stated*, when peroxide of iron is strongly heated in mixture with peroxide or deutoxide of manganese, oxygen is given out by the former as well as by the latter; and, accordingly, the oxygen lost by heat ceases to indicate the nature of the manganese. A moderately correct allowance for the quantity of oxygen emitted by the iron under these circumstances would be difficult, even after ascertaining in the moist way the quantity of iron contained in the ore; since the constitution of the resulting oxide of iron, as well as its uniformity, is probably variable, and, at all events, is undetermined. The chemist would, therefore, have to ascertain separately each constituent of the ore, and consider the loss as oxygen belonging to the manganese,—a method not to be trusted in a complicated analysis, and which would be wholly inapplicable if the iron, as contained in the ore, should happen not to be uniformly oxidized.

I was led to reflect on these difficulties in consequence of being requested, some months ago, to examine a considerable number of different ores of manganese, the object being solely to ascertain the relative quantities of chlorine which an equal weight of each ore was capable of supplying; and as the method to which I had recourse gives such information with rapidity and precision, I have drawn up a short description of the process; not from any novelty being attached to it, but in the belief that it may be useful to persons engaged in a similar inquiry.

The method, in principle, consists in dissolving a given weight of the ore in muriatic acid, condensing the chlorine in

* Brewster's Journal of Science, N. S. ii. 213.

water, and, by some uniform measure, estimating the quantity of chlorine relatively to an equal weight of pure peroxide of manganese, selected as a standard of comparison. The substance first used with this intention was a solution of indigo; but a weak solution of green vitriol, employed by Mr Dalton for ascertaining the strength of bleaching powder, was found to be more precise in its indications.

The method of manipulating is as follows:—About ten grains of the ore in fine powder is introduced into a flask capable of containing about an ounce of water, and into its neck is fitted by grinding a bent tube about two inches long, which conducts the chlorine from the flask into a tube about sixteen inches in length, and five-eighths of an inch wide, full of water, and inverted in a small evaporating capsule, employed as a pneumatic trough. The apparatus being adjusted, the flask is half filled with concentrated muriatic acid, the conducting tube instantly inserted, and heat applied by means of a spirit-lamp. The air of the flask, together with the chlorine, is then collected, the greater part of the latter, if the gas is not very rapidly disengaged, being absorbed in its passage; and consequently, the receiving tube, at the close of the process, will be about half full of gas. When the ore is completely dissolved, the last traces of the chlorine are expelled from the flask by muriatic acid gas. In order that the chlorine thus collected may be entirely absorbed, the aperture is closed by a ground stopper, or, still more conveniently, with the finger, and the gas is well agitated until the chlorine is wholly absorbed. As the solution in the inverted tube may become too saturated to dissolve all the chlorine, it is convenient to fill a pipette with pure water, and, with the aid of the mouth, force a current to ascend into the tube, and thereby cause the heavier solution to flow out into the capsule.

The absorption being complete, the solution of chlorine is introduced into a six or eight ounce stoppered bottle, and a dilute solution of green vitriol, made, for example, with a hundred grains of the crystallized salt and a pint of water, is added in successive small quantities until the odour of chlo-

rine just ceases to be perceptible. The quantity of liquid required for the purpose may be conveniently measured in a tube about sixteen inches long, and three-quarters of an inch in diameter, divided into two hundred parts of equal capacity, and supplied with a lip, so that a liquid may be poured from it, without being spilled. In conducting this part of the process, the operator will perceive two odours:—at first, the characteristic odour of chlorine, accompanied with the peculiar irritation of that gas;—and subsequently an agreeable, somewhat aromatic odour, unattended with the slightest irritation. The object is, to add exactly so much solution of iron as suffices to destroy the former of these odours, without attempting to remove the latter; a point which, with a little practice, may be readily attained. The whole of the iron is thus brought into the state of peroxide.

The first trial is generally accompanied with some loss of chlorine, and should only be used as a guide to a second and more precise experiment. Accordingly, a weighed portion of the same ore is dissolved, and the chlorine collected as before, except that the solution of green vitriol, in quantity rather less than sufficient, is at once introduced into the inverted tube and capsule. A more ready and perfect absorption of the chlorine is thus effected, and the subsequent addition of a small quantity of sulphate of iron suffices for completing the process.

The principal sources of error in this method are the two following:—loss of chlorine, by smelling repeatedly, and exposure to the air when the gas is absorbed by pure water; and oxidation by the air when the absorption is made directly by means of the solution of iron. The small flask and inverted tube are apt to retain the odour of chlorine, and should therefore be rinsed out with the absorbing liquid. It should be remembered, also, that a given quantity of chlorine will emit a more or less distinct odour, according as it is less or more diluted. But by operating always in the same manner, and employing such weights of different ores, that equal quantities of the solution may contain nearly equal quantities

of chlorine, it is easy to be independent of these errors of manipulation, by causing them to affect each experiment to the same degree. It will accordingly be found, with a little practice, that results of surprising uniformity may be thus obtained; and even the constitution of pure oxides of manganese may be ascertained by this method, almost with the same accuracy as by directly determining the quantity of oxygen.

Journ. Roy. Instit. Feb. 1831.

ART. XXIV.—*On Indigo. By Andrew Ure, M.D.,
F.R.S., &c.*

AMONG the vast variety of vegetable products, there is probably none so interesting to science, by the curious complexity of its nature, and the protean shapes it may be made to assume, as indigo; and, certainly there are few more important to British commerce and enterprise, since it constitutes the most valuable article of export and remittance from Hindostan. At the four quarterly sales appointed by the East India Company, no less than twenty thousand chests of this dyeing drug are, on an average, brought annually into the market. A very considerable quantity of indigo is also imported into Europe from America and Egypt. It is not long since the Caracas and Guatamala indigo held a much higher character, and commanded a much better price than that of India; but the improvements due to the intelligence of our planters in the East have, within these few years, enabled them to prepare an article very superior to the finest American. The sequel of this paper will present satisfactory proofs of this assertion.

Indigo is procured from many different species of plants, belonging to Tournefort's natural family of the leguminous, included for the most part in the genus called *Indigofera* by

Linnaeus. According to Heyne, the *Indigofera pseudo-tinctoria* cultivated in the East Indies, produces the best indigo; but others extol the *Indigofera anil*, the *Ind. argentea*, the *Ind. disperma*, which yields the Guatamala kind, and some the *Mexicana*. About sixty species of the *Indigofera* are at present known; but those above named are in peculiar esteem. My object in stating these differences here is chiefly to show that a drug obtained from such a variety of vegetable species must necessarily vary in composition. The matter which affords the indigo is confined entirely to the pellicle of the leaves, and exists in largest quantity at the commencement of maturation, while the plant is in flower; at a somewhat later period the indigo product is more beautiful but less abundant; afterwards, much less of it is obtained, and of a worse quality. The plant is remarkable for giving a blue tinge to the urine and milk of cows that feed upon its leaves; a circumstance which accords with the known permanence of the dye. The statement of Mr Weston, in this Journal (No. XXVII. p. 296),* agrees with these observations on the ripening of the blue principle. He shows that the developement of this matter in the *Indigoferas* goes on in the leaves, even after they are separated from the plant and dried. When packed up for a few weeks, more or less, according to their preceding state of ripeness, the leaves assume a light lead colour, which gradually deepens into a blackish hue. The planter studies to seize the period at which the *maximum* portion of colouring matter is formed, that he may then transfer the leaves to the steeping vat.

Three different processes are employed for extracting the indigo, each of which must modify more or less the nature of the product. In the first and second, the dried leaves are operated on; in the third, the recent plant. For the perfect success of the two former processes, the plant should be very speedily deprived of its water of vegetation; hence the *Indigofera* is reaped only in fair weather. An hour and a half before sunset, the plants are cut down, carried off the

* Quarterly Journal of Science.

field in bundles, and immediately spread on a dry floor. Next morning at six o'clock, the reaping is resumed for an hour and a half before the sun acts too powerfully on vegetation, and the plants are treated in the same way. Both cuttings become sufficiently dry by three o'clock, P. M., to permit the leaves to be separated from the stem by threshing. The leaves are now thoroughly dried by exposure to the sun, then coarsely bruised, or rather ground to powder in a mill, and packed up for the use of the manufacturer of indigo.

From these powdered leaves, the dye stuff is extracted either by simply digesting them in water, heated to 150° or 180° F., in as small a proportion as may be practicable, and subsequently beating the infusion with paddles till the blue indigo granulates, as Roxburgh recommended; or by mashing the ground leaves with twice their bulk of water, at the atmospheric temperature, drawing off the liquor into a vat, where it speedily undergoes fermentation, and is beat as above with paddles or oars, till the blue indigo forms. Some persons prescribe the addition of lime water at this stage of the process; others reject its use.

In operating on the recent plant, it is laid in bundles in the steeping trough (*trempoir*), which contains sufficient water to stand about two inches above plants slightly pressed down by crossing bars of wood. A brisk fermentation soon begins, with copious extrication of air-bubbles. This process is suffered to proceed till the liquor has become green, and casts up a pellicle of a copper red hue. A sour smell is now perceived, and the blue colouring particles seem ready to separate. This happens commonly at the end of from ten to twenty hours, according to the temperature of the weather. The liquor is then run off into the beating vat, and lime-water is added, or not, according to the fancy of the operator. In all cases of fermentation, whether the dried leaves or the recent plant be employed, it is proper to watch the progress of that change with solicitude; because, when too violent, it not only decomposes entirely some of the indigo blue, but introduces much foreign vegetable matter

into the precipitate; when too feeble, it is said to leave some indigo unextracted.

From the differences which exist in the nature and culture of the *Indigofera*, and of its treatment by the manufacturer, the product, *indigo*, as found in commerce, differs remarkably in quality and chemical composition. In this respect, it forms a complete contrast to the simple crystalline product sugar. Besides impurities accidentally present, from a bad season, want of skill or care, the purest commercial indigo consists of no less than five constituents—1. *Indigo-blue*, a very singular vegetable compound of carbon, hydrogen, and oxygen, with fully 10 *per cent* of azote.—2. *Indigo-gluten*, a yellow, or brownish-yellow varnish, which differs from wheat-gluten by its solubility in water. It has the taste of osmazome, or of beef-soup, melts when heated, burns with flame, and affords an empyreumatic oil along with ammonia by distillation.—3. *Indigo-brown*. This constituent is more abundant than the preceding. It is extracted by a concentrated water of potash, made to act on powdered indigo, previously digested in dilute sulphuric acid. Chevreuil's indigo-green seems to have consisted of this substance, mixed with some alkaline matter, and indigo blue.—4. *Indigo-red*. This is readily dissolved by boiling alcohol, out of indigo previously subjected to the action of an acid or alkaline menstruum. The alcohol acquires a beautiful red tinge, and leaves by its evaporation the red principle in the form of a blackish-brown varnish.—5. *Phosphate of lime*. I have found the bone phosphate in notable quantity in some fine indigo, constituting another feature of resemblance between this vegetable and animal products. Hence, also, the charcoal of indigo is most difficult of incineration, and requires, for perfect combustion in some cases, the deflagratory powers of nitric acid.

Pure *indigo-blue* is most easily obtained from the blue vat of the indigo-dyer; the yellow liquid of which being acidulated faintly with muriatic acid, and exposed, with occasional agitation, in a shallow basin, soon deposits the blue preci-

pitae, mixed, however, with a considerable quantity (more or less according to the quality of indigo used) of indigo-red. This must be removed from the dried blue powder, by the solvent action of boiling alcohol, applied in successive quantities.

In my paper on the "Ultimate Analysis of Vegetable and Animal Substances," which the Royal Society did me the honour to read at their Meeting in June 1822, and to publish in the volume of their Transactions for that year, I gave an analysis of *indigo-blue*, to which I appended the following remarks:—"I had intended to pursue at considerable detail my researches on this azotized product of vegetation, but the subject having been lately taken up by my pupil and friend, Mr Walter Crum, I was induced to leave it in his hands." I then thought it likely that some slight modification might require to be made in the weights of the constituents given by me, for "I did not (then) resume the subject of indigo, after I had become most familiar with the manipulations." I have found since that my mode of analysis was not in fault, but the revived *indigo-blue*, which I employed, had not been entirely purged of the red principle, by sufficient ebullitions with alcohol; for it adheres very tenaciously. Hence that resinous matter introduced a little oxygen and hydrogen, more than absolute indigo-blue contains. But the error will appear inconsiderable, if we compare the result with the analysis previously published by Dr Thomson. The following is a view of the ultimate constituents of *indigo-blue*, as given by different chemists:—

	Thompson.	Ure.	Crum.	Royer and Dumas.
Carbon	40.384	71.37	73.22	71.71
Oxygen	46.154	14.25	12.60	12.18
Azote	13.462	10.00	11.26	13.45
Hydrogen	0.000	4.88	2.92	2.66
	<hr/> 100.000	<hr/> 100.00	<hr/> 100.00	<hr/> 100.00

That pure indigo contains hydrogen, I have recently placed beyond a doubt, by heating a mixture of it and calomel in a green glass tube, the open end of which terminated

in an inverted tube, filled with nitrate of silver. Copious fumes of muriatic acid were evolved, and chloride of silver was precipitated in its characteristic curd.

The liquor of the dyer's vat (for calico-printing) contains indigo deoxidized by protoxide of iron, and dissolved in lime water. This solution, in its average state of richness, has a specific gravity not appreciably higher than that of distilled water, and affords out of 1000 parts, by weight, not more than 3 parts of indigo-blue, and nearly the same quantity of carbonate of lime, equivalent to about a grain and a half of quicklime in 1000 of the liquid; which is the proportion in common lime-water.

If that yellow liquor be introduced into a glass globe, with a graduated stem, previously filled with hydrogen, by plunging the vessel into the vat, we may transfer a portion of deoxidized indigo conveniently to the mercurial pneumatic trough, and measure the quantity of oxygen which a given bulk of it absorbs in becoming blue. This quantity will be proportional to the strength and purity of the vat-liquor. I have lately instituted a series of experiments, the results of which will, I hope, prove interesting in reference to the problem for determining the quality or purity, and strength, of different commercial indigoes; but they are not yet mature enough to meet the public eye. The rigid mode of examining this drug is to eliminate the *indigo-blue* from the other substances, by the readiest artifices of analysis, and to weigh it apart. It may be objected to the analysis of indigo, that it is too complex and operose a process to be practicable with the despatch and to the extent which the public quarterly sales of indigo require. But I conceive this to be a mistake. When only one object is pursued, various arrangements may be contrived for readily attaining it. Under this conviction, I ventured to state, ten years ago, in the introduction to the first edition of my Dictionary of Chemistry, that "the result of numerous researches, made with that view, has shown me the possibility of rendering analysis in general a much easier, quicker, and more certain operation, than

it seems hitherto to have been in ordinary hands." My experience since has fully justified that statement.

Accordingly, about three years ago, I suggested to the honourable court of Directors of the East India Company, the propriety of establishing an Assay Office for Indigo in Calcutta, to guide them in their purchases of that article, and to enlighten the manufacturers in Bengal about the value of their various products and processes; and I again submitted to their consideration, last autumn, a memorial to the same effect, in which I detailed the advantages likely to accrue from such establishment to indigo-planters, dealers or brokers, and consumers. But the court did not think it expedient at present to make any alteration in their indigo department. The quantity of indigo required, for the assay need never exceed ten grains, provided a very delicate assay-balance be employed; and by a suitable system of arrangements, the average quality of 500 chests may be accurately determined in the course of a day, by a diligent chemist, with four or six ordinary assistants to follow his directions.

REVIEW.

ART. XXV.—*Researches on the Chemical and Medical Properties of the Root of Kahinca. By MM. Francois D.M. Caventou and Pelletier, Pharmaciens, Members of the Royal Academy of Medicine. (Extracted from the Journal Generale of Medicine, May, 1830.) Translated by John Baxter M.D. Member of the Medical Societies of Philadelphia and New York.*

THE above is the chief part of the title to a pamphlet of fifty-two pages. The memoir on the root of the Kahinca was originally read before the Royal Academy of Sciences, 27th December 1829. We have not had access to the "Journal Generale de Medicine," in which it was published or we should greatly have preferred translating some account of this interesting article for ourselves. As it is, we shall endeavour to *translate* some of Dr Baxter's translation for the benefit of our readers. We feel very much disposed to view with indulgence every effort of our medical brethren either for fame or emolument, because we hope for some little indulgence from their wonted generosity for ourselves. But we would take the liberty of suggesting to Dr B. the propriety of elaborating a little more the productions of his pen.

He has translated two or more editions of Magendie's Formulary—which with the pamphlet before us bear inexcusable marks, either of negligence or ignorance. We are at a loss to decide whether the translator of these works is an American or a Frenchman ; for he certainly does not under-

stand the idioms of both languages, or he would not send to the press and the public the words of one with the idiom of the other. As to the correctness of the translation we cannot pretend to determine as we have not the original to compare it with, and some parts are nearly unintelligible. But leaving the classical English of the translator, we shall proceed to give some account of the Kahinca. It will perhaps be remembered by some of our readers that we published in No 1, vol. ii. p. 84, of our journal a short notice of this article and its active principle.

It appears from the statements of the French chemists in their memoir, that the first account of this medicinal plant was published in 1826 in some European journal by Major Langsdorf, consul general of Russia at Rio Janeiro. This shrub called by botanists, *Chiococca racemosa* is a native of the interior provinces of Brazil. Its medicinal properties have been long known to the natives of that country, and it has been employed as a remedy by some of the physicians of the empire. But it is only lately that it has attracted the attention of the chemists and physicians of Europe, and it promises to prove a valuable addition to the class of diuretics.

It bears the popular names of *Kahinca* or *Cainca*, *Kahinina*, from being used to cure the bite of a serpent called *Camiana*, and *Raiz Preta* or black root. In the museum of natural history of Paris there are two of these shrubs nearly two feet in height. A botanical description has been given by M. Achille Richoud. The *Chiococca racemosa anguifuga flore luteo* belongs to the family Rubiaceæ, and to the class pentandria, order digynia of Linnæus. Generally it does not exceed a height of five or six feet, though sometimes it assumes the dimensions of a moderately sized tree and attains an elevation of thirty feet. The stem is smooth, ligneous and branching; the branches are slender, the leaves opposite, elliptical, acuminate, entire, smooth, green on both surfaces, and supported on short footstalks. There is a small caducous stipula on either side of the

stem between each pair of leaves; the flowers are yellow, and in small clusters at the angle formed by the junction of the leaves and branches, and are about as long as the leaves. The calyx of the flower is globular, and adherent with the ovary inserted; it is terminated above by a limb dividing into five small teeth; the corolla is monopetalous, spreading and almost bell-shaped, with five reflected lobes. The five stamina are slightly salient; the fruit is a small berry very white and compressed.

This shrub prefers uncultivated and sterile places, the barren earth of which is compact and hard, as may be inferred by the solidity of its root, the close texture of its fibres, and the ease with which the bark may be separated. This root is of a moderate size, invested with a brown or amber-coloured bark, having an aromatic and nauseous odour, and very bitter taste. The bark is hard, brittle and compact covering a white medullary substance, insipid and inodorous, and which constitutes nearly the entire mass of the root. So slight is the connexion between the root and its cuticle, that the latter may be entirely separated by simply bruising it between two hard substances.

We shall endeavour to condense the account of the analysis of this root as much as possible.

After exhausting a portion of it by successive macerations in alcohol of 35° B., the tincture was subjected to distillation in a water-bath until $\frac{2}{3}$ were drawn off. The remainder was transferred to a platina capsule and evaporated at a slow heat until some zones of concrete matter were perceived upon the sides of the capsule. After standing for twenty-four hours the liquor was observed to have assumed the form of a gelatinous mass, in which was contained a matter that seemed opposed to a regular crystallization. This mass was treated with cold distilled water until the fluid ceased to act on it. It was then filtered in order to collect a flocculent, yellow brown, aromatic, greasy looking substance. The latter, when purified by boiling in water and solution in ether, was of a green colour and the whole virulent material of the

root resides in it. That which remains undissolved by the ether is soluble in alcohol, granular, insipid and of the colour of Spanish tobacco.

The aqueous solution, from which the greasy matter was separated, retains all the bitterness of the root; reddens the vegetable blues; yields no precipitate with caustic ammonia; is slightly troubled by the alkaline carbonates; precipitates by acids and the tincture of nut galls.

Another portion of the same aqueous solution, when evaporated to a proper point for crystallization, again assumed the form of a concrete mass; and the operators were unable to make it crystallize.

They therefore poured into a third portion of the aqueous bitter solution a sufficient quantity of sub-acetate of lead, to precipitate all the material susceptible of being acted upon by this reagent. The abundant precipitate was separated by a filter, and the liquor was found to be nearly colourless and to be deprived of all bitterness.

This precipitate was repeatedly washed in boiling distilled water, and a current of sulphuretted hydrogen passed through these washings when united. The sulphurets of lead being separated, the liquor was again evaporated and left to itself. Some crystals were obtained at the end of several days formed in the midst of a thick viscid matter. These crystals were acetate of lime.

The sulphuret of lead of the last experiment was again treated with distilled water, through which more sulphuretted hydrogen was passed. The liquor procured by filtration yielded by evaporation a yellow extractive matter slightly bitter.

The bitter principle still continued united with the sulphuret of lead, and this was therefore subjected to the repeated action of boiling alcohol, until it ceased to acquire bitterness.

These tinctures were united and two-thirds drawn off by distillation, when, before the remainder was cold, distinct

needle-shaped crystals were deposited almost *en masse* of a yellow brown colour.

These were redissolved in boiling alcohol with animal charcoal, and handsome crystals of the bitter principle were procured.

From this analysis four distinct substances were procured, viz:—

1. A crystallized principle containing all the bitterness of the root.
2. A fatty green matter of a nauseous smell, in which resides all the odour of the root.
3. A yellow colouring matter.
4. A coloured viscid substance.

Properties of the Bitter Principle.

This principle when pure is white, and crystallizes in minute needles which assume an arrangement similar to those of muriate of morphia.

It is destitute of odour, and its taste which is scarcely perceptible at first, soon becomes exceedingly bitter and leaves a slight and evanescent impression of astringency in the throat. It is permanent in the open air, being neither efflorescent, nor deliquescent. At the temperature of boiling water it is unaltered in colour and form, but exposed in a glass tube to the action of an alcoholic lamp it is decomposed. It softens, carbonizes and becomes converted with a thick, white heavy vapour, which condenses on the sides of the tube partly in mass and partly in very light and small brilliant crystals. Both the crystals and the concrete mass appear to be destitute of bitterness and to be in fact of another nature from the original principle. No ammonia was evolved during the combustion. Burnt in a platina crucible when perfectly pure it leaves no residue, but its affinity for lime is so strong that it is exceedingly difficult to separate it from this earth.

More than six hundred times its weight of water are required to dissolve it, and its solubility in ether is also very

slight; alcohol is its appropriate solvent. Boiling alcohol takes up more than cold, and the salt separates on cooling in a crystalline form. The most singular feature of this vegetable principle is the property which it possesses of reddening the vegetable blues, in the same manner as the acids. The translator further says: "The action of concentrated acid on the bitter principle is not less remarkable: the sulphuric dissolves it, and *carbon* immediately *decomposes* it." Does he mean that *carbon* is a concentrated acid? or that carbon-unaided by heat will decompose it? It is dissolved by hydrochloric acid, and the solution immediately assumes the form of a transparent gelatinous mass. This mass dissolved and washed in water appears destitute of all bitterness.

Nitric acid acts on it, and is itself decomposed, evolving the fumes of nitrous gas. The result is a bitter yellow matter in which is found no trace of oxalic acid. These acids when diluted scarcely act on the bitter principle.

The effect produced by the radical acetic acid depends upon the temperature at which it is employed. If the solution be made cold, unaltered crystals will reappear by spontaneous evaporation; but if heat be applied the mixture becomes brown, and by standing assumes the shape of a gelatinous mass, similar to that produced by the mineral acids, and destitute of all bitterness.

When this principle is mingled with the solutions of ammonia, potash or baryta, it unites very readily with the three alkalies, but forms no crystallizable salts. When added to lime water, the latter preserves its transparency, but if lime in excess be employed, a considerable precipitate immediately follows, which is a sub-combination of the bitter principle and the lime. Alcohol dissolves this compound, but when hot it takes up a larger proportion, from which by standing it separates in the form of flakes, possessing strong alkaline properties, and capable of restoring vegetable blues reddened by an acid. The solution of this principle in common lime water, like the other solutions affords no crys-

tals by evaporation. But all of these combinations of it with alkalies are soluble in alcohol, and possess great bitterness. They are also dissolved by water and may be decomposed by acids, added to the solution. The French chemists state that this bitter principle exists in the root of the Kahinca in the form of a sub-salt with a base of lime. It possesses some properties which are peculiar to itself; but from the existence of those qualities which entitle it to rank with the acids, the discoverers have designated it by the title of *Kahincic acid*.

It is not our intention to say much respecting the therapeutic action of this remedy. But as it is nearly unknown in this country and appears to possess properties which entitle it to a high rank in the materia medica, we shall detail a few of the results obtained by the French physicians. They have administered the powdered bark of the root in doses from 10 grs. to 1 drachm, but as its operation is somewhat uncertain in this form, they prefer the aqueous extract, which operates with more certainty in doses, of 12, 15 or 20 grains. They also gave it in the form of enema with very happy effects. It is not very prompt in its action, and appears to affect chiefly the lower bowels when it proves cathartic. It either determines to the kidneys or the bowels, and when one of these effects takes place the other usually does not precede or follow; sometimes, however, the diuretic succeeds to the cathartic action after a lapse of some hours. The Kahinca occasionally produces nausea and pain, but generally its operation is mild and certain. Its medicinal properties may be said to be tonic, cathartic, and diuretic; and, from the cases recorded by the French physicians, we have every reason to hope and believe it may prove one of our most effectual remedies in the cure of dropsy.

Minutes of the College.

March 29th, 1831. The Board of Trustees informed the College of the election of Dillwyn Parish as a resident member.

The Treasurer's report was read and adopted.

The following gentlemen were duly elected officers, trustees, &c. for the ensuing year.

President,—Daniel B. Smith.

Vice Presidents,—Henry Troth, Samuel Jackson, M.D.

Secretary,—Charles Ellis.

Treasurer,—Edward B. Garrigues.

Corresponding Secretary,—Elias Durand.

Trustees,—Alexander Fullerton, Jun., Warder Morris, Samuel C. Sheppard, Joseph Reakirt, John Carter, Edward Needles, Robeson Moore, Charles H. Dingee.

Publication Committee,—Benjamin Ellis, M.D., Daniel B. Smith, George B. Wood, M.D., Samuel P. Griffiths, Jun., Charles Ellis.

June 28th. The Board of Trustees informed the College of the election of John Milhan, of New York, as an associate member of the College.

A vacancy having been occasioned in the Board of Trustees by the decease of Dr Benjamin Ellis, the College duly elected Peter Lehman a Trustee for the unexpired time of Dr Ellis.

Adjourned meeting. June 30th. The Publication Committee reported, that from the sudden death of Dr Benjamin Ellis, the editor of the Journal, they had been induced on

their own responsibility to engage Dr R. E. Griffith to edit the number now in the press.

It was on motion resolved, that the member of the Publishing Committee who acts as Editor of the Journal, may receive for his services all the clear profits of it, until they amount to 100 dollars, and then in addition such portions of the profits over and above that sum, as the College may from time to time determine.

The Board of Trustees having recommended Drs Franklin Bache and Robert E. Griffith, as suitable candidates for membership in the College; the College proceeded to ballot for them, when they were duly elected.

On motion, the College, on recommendation of the Publication Committee, proceeded to elect a member of that committee to supply the vacancy occasioned by the death of Dr Benjamin Ellis, when Dr Robert E. Griffith, was duly chosen.

On motion, resolved, that the Publication Committee are authorized to reprint 250 copies of No. 3, vol. 1st, and to draw if necessary on the Treasurer of the College for funds to defray the expense of the same.

Extract from Minutes of the Board of Trustees.

On motion, the Board proceeded to ballot for a Professor of Materia Medica, to supply the vacancy occasioned by the death of Dr Benjamin Ellis, when George B. Wood, M.D. was duly elected.

The Professorship of Chemistry being declared vacant by the election of Dr Wood to that of Materia Medica, it was on motion resolved, that the Board proceed to election of a person to fill that vacancy; whereupon Franklin Bache, M.D. was declared duly elected.

MISCELLANY.

Berberine.—From an analysis of the root of the barberry (*Berberis vulgaris*) by MM. Buchner and Herberger, it appears that it contains a new principle, which they term Berberine. From 100 parts of the root they obtained 17 parts of this salt, which is of a yellow or brownish colour, very bitter taste, slowly deliquescent, and decomposed by any degree of heat above 167° Fahr. It is very soluble in water and alcohol, but not in pure sulphuric ether. The solutions are of a brown colour, of great intensity: even one part of berberine will tinge 4500 parts of water. The best mode of preparing it is:—The root being deprived of its volatile oil, fatty matter and wax by means of sulphuric ether, the residue is to be treated by alcohol at 107° Fahr.; this tincture is to be evaporated to the consistence of extract; the residue redissolved, filtered and caustic ammonia added, which will cause a precipitate; it is to be again filtered, and evaporated by a gentle heat, acetic acid being added to neutralize any excess of ammonia. The residue is to be again dissolved in alcohol, from which the berberine will be obtained in a pure state on evaporation.

This article acts like rhubarb, and with equal promptness and efficacy.—*Journ. de Pharmacie.* Jan. 1831.

Colombine.—Mr Wittstock of Berlin has obtained a new crystalline substance from the Colombo root, which he calls Colombine, by the following process. The Colombo root is to be treated with alcohol 0.835; this tincture to be distilled in a water bath till it is reduced to one third or one quarter, the residue to be permitted to stand undisturbed for some days, when crystals will be formed, which are to be washed, and boiled with a little alcohol and animal charcoal in order to purify them. A further quantity of crystals may be obtained from the mother-water, by evaporating it to dryness in a water-bath, after having added animal charcoal: the extract, after being reduced to powder, is to be treated several times by ether (0.795) and distilled, and the residue left to evaporate spontaneously, the wax, fatty matter and the Colombine will gradually be deposited, and the latter can then be separated by means of acetic acid. By this means Mr Wittstock obtained one drachm of Colombine from sixteen ounces of the root. The crystals are transparent quadrilateral prisms with rhomboidal bases. A single grain is sufficient to kill a rabbit.—*Journal de Pharmacie.* Feb. 1831.

Preparation of Liquid Ammonia.—*Bizio.*—A tubulated retort is to be put into a sand-bath, and connected with a small balloon placed on a little furnace; a tube

is to proceed from the balloon to a flask which is to be supplied with a safety tube, and with another tube dipping into a mercurial bath. Equal parts of sal ammoniac and hydrated lime are to be used; the lime is to be made into a cream with water, and put into the retort, and then the powdered sal ammoniac added; after being well mixed the retort is to be closed; water, equal in weight to the sal ammoniac, is to be put into the flask; the retort in the sand-bath to be heated, and the balloon moderately warmed. As the ammoniacal gas is disengaged it will be absorbed by the water in the flask. By managing the fire properly, and distilling the portion of impure ammonia in the balloon, pure ammonia of the a.g. of .910 will be obtained, sixteen pounds being produced for every ten pounds of sal ammoniac employed. M. Bizio says that the ordinary processes do not give more than one half of this quantity.—*Bull. Univer.*

Singular Action of Arsenic on Sugar.—When a solution of pure arsenic acid is mixed with sugar and left for a few hours, a rose colour is produced which soon becomes a fine purple, and then remains with little further change, for many days. Sugar of milk, mannite, raisin sugar, sugar of starch, produce similar effects; but sugar of liquorice, diabetic sugar, and such bodies as starch, gum, &c. produce no effect of the kind. Nor do the soluble arseniates or arsenious acids produce these effects with the substances named above.—*Ibid.*

New Substance found in the Semen Contra (Artemesia Judaica), by M. Kahler.—This pharmacist treated a pound of the semen contra by ether till the latter was no longer coloured, and distilled the tincture in a tubulated retort with a spirit lamp. The residue was of an oleaginous consistence. The next day he found the bottom and sides of the retort covered with small crystals, which he dissolved in warm ether; crystals again formed on cooling. The supernatant ether was evaporated by a gentle heat, and the crystals dissolved in warm alcohol of 0.896, to which a little hydrochloric acid had been added. The solution took place before the alcohol came to the boiling point, and crystals were formed after the fluid was left for twenty-four hours in a temperature of 59° Fahr. The crystals possessed the following properties. They were soluble in ether and alcohol. They combined with hydrochloric acid, but their affinity was feeble. They are soluble in ammonia by heat, almost insoluble in water. Scarcely any smell or taste. When exposed to the rays of the sun they became yellow, and at a high temperature burnt with a beautiful flame.—*Journal de Pharmacie.* Feb. 1831.

Salicine from the Athenian Poplar; from a Memoir of M. Braconnot on Salicine and Populine. M. Braconnot having employed the bark of the populus tremula with success in fevers of various kinds, satisfied himself by some experiments that it contained, 1, salicine; 2, corticine; 3, populine; 4, benzoic acid or its elements; 5, a gummy matter; 6, a principle soluble in alcohol, which reduced the salts of gold, silver and mercury; 7, tartrates of lime and of potassa.

The discovery of salicine in the bark of the aspen induced M. Braconnot to seek for it in other vegetables. His researches have proved it to exist in the populus alba, the populus græca (Athenian poplar), in the salix fissa, amygdala and helix; and he has remarked that in certain species of willow both the salicine and tannin disappear entirely and give place to a saccharine matter.

M. Braconnot's process for obtaining the salicine is as follows. He makes a decoction of the bark of the aspen, and pours into it subacetate of lead. The colourless liquid thus obtained is deprived of its excess of lead by its sulphuric acid.

A little washed animal charcoal is then added, and the boiling liquid being filtered is put aside, and deposits the crystallized salicine upon cooling.—*Journ. de Chim. Med.* Jan. 1831.

Carbonate of Iron.—The observations of Mr Clarke, in a short article on the preparation of carbonate of iron, are well deserving of attention. He states, that when this medicine is prepared according to the direction of the British Pharmacopœias, it absorbs oxygen so rapidly while drying as to be almost entirely converted into red oxide, a substance very different in its medicinal properties, and which may be given to almost any extent without producing any apparent effect except in the fecal evacuations; to which circumstance, we have no doubt, are owing the very different reports which have been made by various practitioners as to the dose and properties of this substance. Mr Clark, therefore, proposes to avoid the exposure of the precipitate to the action of the air, and gives the following formula, by which a true carbonate may be obtained.

“Take of sulphate of iron and subcarbonate of soda, each eight ounces. Pound each salt, and dissolve separately in warm water. If necessary, filter. Being filtered and cooled, mix the solutions in a deep vessel, capable of holding one or two gallons of water, which fill up with cold. Stir—let subside—and decant the clear liquor from the precipitate. Fill up again with water and likewise again decant; and repeat the operation two or three times so as to separate the soluble salts. Next put the precipitate on a filter of cotton or linen cloth supported by a square frame. When the water has ceased to pass, gather into one hand the edges of the filter, so as to make a sort of bag, and with the other twist it round from the holding hand downwards, so as to squeeze out the remaining water. The precipitate will now have the appearance of clay, too soft for moulding. With soft sugar and aromatic powder make into an electuary.” “Thus,” says he, “we obtain a carbonate of iron, uniform in its proportions, hardly deteriorated by the process it undergoes, and little liable to change by keeping.”—*No. 383, Lancet.* Jan. 1, 1831. —*From the Glasgow Med. Journal.*

Adulteration of Strychnine.—M. Robiquet mentions that this article is very often adulterated by the admixture of various inert articles, even to the extent of forty, or fifty per cent. The substance principally used for this purpose is magnesia. This fraud may be detected by calcining the suspected sample. Another mode of adulterating is by mixing the impure strychnine with ivory black, which contains phosphate of lime, and then adding undiluted acid, which takes up the strychnine and the earthy salt; this solution is then filtered and precipitated by ammonia, thus producing a mixture of the vegetable alkali with no inconsiderable quantity of the phosphate. Calcination will detect this fraud also.—*Journal de Pharmacie.*

Nicotine.—MM. Posselt and Reimann have completely succeeded in separating the alkaloid principle, which Vauquelin believed to exist in tobacco, but which that distinguished chemist failed to obtain in a separate state. This new substance, nicotine, as described by the present authors, is liquid at 44° Fahr., transparent, of a brown red colour, of a disagreeable, pungent odour, like that of dried tobacco, and which is increased by an elevation of temperature, taste exceedingly acrid, and remaining long on the tongue. It communicates a greasy stain to paper, disappearing in twelve hours; specific gravity greater than water; volatile in the open air, leaving a small resinous residuum; boils at 460° Fahr., burns when touched by a lighted taper, and at 212° Fahr. evolves abundant white vapour. Nicotine is

soluble in water in all proportions, the solution is decidedly alkaline, and, diluted with 10,000 parts of water, still preserves its acrid taste. It is equally soluble in alcohol, ether and almond oil. The ethereal solution, mixed with muriatic, tartaric or acetic acid, parts with all its nicotine, and salts insoluble in ether are produced. Neutralized by phosphoric acid, the new alkaloid furnishes a colourless syrup, which, when exposed to the sun's rays, affords crystals like cholesterol. The sulphate of nicotine assumes the form of an amorphous mass, slightly acid. Finally, with oxalic acid, nicotine forms a crystalline soluble compound. The nitric acid does not unite with it, but nearly effects the decomposition of this alkaloid.—*Geiger's Magazin sur Pharm.—From the New York Med. Journ.*

Trees furnishing the Cinchona.—From various investigations M. Deirbach, Professor at Heidelberg, has come to the following conclusions.

The best Cinchona comes from Peru and New Granada; the Brazilian barks are of less value, and those from Asia have not been sufficiently investigated. The most valuable species, and those richest in the alkaloids, are found in the most elevated and coldest of the tropical regions of the new world. The species which grow in low and warm situations in the same regions, furnish barks of much less power. The cinchonas of Peru are generally richest in *Cinchonia*, and those of New Granada in *Quina*. Peru generally furnishes the brown and gray kinds; New Granada, the yellow and red. The species, which contain the greatest proportion of alkalies have for the most part a hairy corolla of a red or violet colour. Those on the contrary which contain but little of these constituents, generally have a smooth and white corolla. The smooth or hairy state of the leaves furnishes no certain indications.—*Bull. des Sciences.—From Geiger's Mag.*

Method of preparing Piperine and of obtaining it pure on the first or second Crystallization, by P. F. Tonery.—Two pounds of ground black pepper are to be introduced into a matrass, and three pounds and a half of alcohol at 36° added to it; this is to be digested at a heat of 100° to 119° Fahr. progressively elevating the temperature to 172° or 177° Fahr.; this fluid is then to be decanted, and a fresh portion of alcohol added; and the process repeated; the residue is to be pressed, and the fluids united together and permitted to cool to give time for the fatty and flocculent matter to precipitate; this tincture is to be filtered, when it will be of a brown colour; it is then to be treated by about six or seven ounces of the protoxide of lime, added gradually, after which it is to be heated by degrees to ebullition, and often stirred; the brown colour soon assumes an opaline tint, when this has taken place, the liquid is to be decanted, and the calcareous residuum treated with boiling alcohol. These fluids are to be united together, filtered and kept in a temperature of from 75° to 85° Fahr. when well defined crystals of piperine, of a slightly opaline colour, and almost deprived of colouring matter, will be formed by the spontaneous evaporation.

As the last portions of the mother-water crystallize with great difficulty on account of the presence of a resinous matter, it is to be precipitated by water acidified by hydrochloric acid or by simple water. The silky precipitate redissolved in boiling alcohol, and the process continued as before.

The products resulting from these operations only require, to render them pure, to be redissolved in boiling alcohol at 36°, the solution to be slightly concentrated, filtered and again permitted to crystallize as at first, when the piperine will be formed in beautiful prisms and almost white.—*Bull. des Sciences.*

Ruspini's Styptic.—This preparation, which has obtained some celebrity in England for restraining hemorrhages that cannot be commanded by the needle and ligatures, has lately been analysed by Dr A. T. Thomson, who gives the following result of his experiments in the London Med. and Phys. Journal for March:

"From the effects of the tests employed, there is no doubt that gallic acid is the active principle of this styptic; minute quantities of opium and sulphate of zinc, which I have ascertained it also contains, being of no account, from the smallness of their proportions; the vehicle is alcohol, with a small quantity of rose water, to give it odour. Alcohol dissolves one fourth of its weight of gallic acid; an excellent styptic, therefore, may at any time be extemporaneously prescribed.

New mode of preparing Medicines with Sugar, by M. Beral.—At the meeting of the Royal Academy of Medicine, on the 9th of February, 1830, M. Guibourt made a report on a new mode of preparing remedies with sugar, by M. Beral, pharmacist of Paris. M. Beral first makes tinctures of the medicinal articles with alcohol and ether; these tinctures are afterwards poured upon sugar broken in small pieces, the alcohol or ether is then evaporated, and the medicinal principles which they had in solution remain with the sugar. M. Beral thus obtains a medicated sugar, which may be granulated or powdered for use.

The committee regard these preparations as very useful, and consider them as possessing the following advantages: 1. They contain the medicinal principles isolated from the substances employed in their preparation; 2. The medicinal principles are separated from the stimulating articles in which they are dissolved; 3. They are soluble in water; 4. The doses can be determined with accuracy; 5. Many of the medicinal syrups, in which the dose of the medicine is not well known, may be replaced by the syrup saturated in determined proportions; 6. These preparations may be substituted for the *oleum saccharum*, used at present to give an aromatic flavour to many medicinal preparations.—*Journ. Gen. de Med.*

Kermes Mineral.—The composition of Kermes mineral, as determined by Berzelius and Rose, in accordance with Phillips, has lately been called in question by the French chemists. According to the former, it is exactly the same substance as the common native sulphuret of antimony. Robiquet, Buehner, and Henry, Jr., who found it to contain oxide of antimony, have been joined by Gay-Lussac, who says (*An. de Chim.* xlii. p. 87), that, when treated with hydrogen gas, it gives off water, and that it is in fact a compound of 1 atom oxide of antimony + 2 sulphuret of antimony. Rose has therefore repeated his experiments (*Poggendorfs Annalen*, xvi. 324) with his former results. He prepared his kermes by boiling carbonate of soda on the common sulphuret of antimony, filtering, setting it aside to cool, filtering it again in half an hour to collect the precipitate, drying it well on bibulous paper, and afterwards by a gentle heat till it ceased to lose weight. He found the kermes thus prepared to give no water in a current of hydrogen gas, but to leave 72.71 per cent of metallic antimony. His former analysis gave 72.32 per cent, and Berzelius found in the common sulphuret 72.77 per cent. The residual liquid, according to Rose, after some hours, becomes troubled, and deposits a white sediment, being oxide of antimony combined with soda. If the kermes be not filtered, soon after its deposition, it will thus be contaminated both with oxide of antimony and with alkali; and this is probably the source of the oxide found by the French chemists. Since no carbonic acid is evolved during the preparation of the kermes by this process, all that takes place

is a mere solution of the sulphuret of antimony in the carbonated alkalies.—*Edin. Journ. of Science.*

Hydriodic Ether.—Serullas gives the following improved process for preparing this substance. Into a tubulated retort are introduced 40 gram. iodine, and 100 alcohol of 38° B. Agitate and add 2.5 grains of phosphorus in small pieces. Distil nearly to dryness; add 25 or 30 grains alcohol, and distil again till nearly dry. Water throws down the ether from the solution. After washing, it is to be distilled from chloride of calcium.—*Ann. de Chim.*

Preparation of Phosphorus.—Wöhler recommends, as likely to give phosphorus by a strong heat, ivory black with half its weight of fine sand and charcoal powder. A silicate of lime is formed, and the carbonic oxide and phosphorus come over.—*Pag. An. de Phys.*

Phosphuret of Sulphur.—When the protochloride of phosphorus is exposed to the action of sulphuretted hydrogen, heat is evolved, and there is formed a solid yellow substance without any apparent crystalline form, and adhering strongly to the glass. This is a phosphuret of sulphur. At common temperatures it decomposes water, and at length disappears in it, forming sulphuretted hydrogen and phosphoric acid. Its atomic constitution is probably
2 atoms phosphorus + 3 atoms sulphur.

Edin. Journ. of Science.

Discoloured Chloride of Silver.—Chloride of silver blackened by sun-light is perfectly well known. M. Chevalier obtains it in a similar state by dissolving the recent chloride in ammonia, and passing chlorine gas into the solution; the usual decomposition of ammonia with elevation of temperature, evolution of azote, &c. takes place, and ultimately the liquid becomes turbid, and the chloride of silver appears first gray, and then when the ammonia is entirely decomposed, as a violet precipitate. This precipitate dissolves entirely in ammonia, and is precipitated in a perfectly white state by pure nitric acid. If twenty grains of it be decomposed by zinc in dilute sulphuric acid, it yields fifteen grains of silver, exactly the quantity yielded by similar treatment from twenty grains of white chloride. Hence the difference of the chloride in these two states cannot be referred to difference of composition, but solely to some variation in molecular arrangement.—*Journ. de Pharmacie.*

New kind of Indigo.—The *Registro Mercantil* of Manilla describes a new kind of indigo lately discovered in that island. This plant has long been known to the natives, especially in the provinces of Carimini and D'Albay: they give it the name of *payanguit* or *avanguit*, and obtain a superb blue colour from it. In 1827 it attracted the attention of Pere Mata, one of the members of the Economical Society of Samar. He made experiments with it, formed it into cakes, and dyed cotton, linen and silk goods with it. The colour he obtained was so rich, and so equal to that of indigo, that he sent some of the cakes and dyed fabrics to the Society, who directed other members residing in the same province to repeat Pere Mata's experiments. All obtained the most satisfactory results, and they sent many of the cakes, leaves and even the living plants to Manilla. A committee of merchants and chemists was appointed to ascertain, by every kind of trial, whether the colouring matter was identical with that of indigo, and might be introduced

as such into the market at the same price. The committee reported in the affirmative, and declared that it had all the valuable properties of indigo.—*Bull. Univ.*

On Efflorescence, by M. Gay Lussac.—Many salts when exposed to air effloresce, i. e. lose their water of crystallization and fall into powder; it is generally supposed that those salts, when thus effloresced, are anhydrous. Having known for a long time that this was not the case, I have made some experiments on the salts which are principally efflorescent.

Hydrated sulphate of soda exposed to air, even in damp weather, loses all its water of crystallization.

Phosphate of soda soon becomes opaque, but does not change its form. After three months' exposure, it contained, on July 18th, 7.4 proportions of water instead of 12, its full number. Reduced to powder, and exposed in thin layers on paper to air, till the 26th of the same month, it gave 6.5 proportions. Again exposed during a hot and dry period until the 31st of July, it gave only 5.65 proportions. Then being left exposed until the 21st of October, the quantity of water had increased to 7.3 proportions. Phosphate of soda, which had been calcined, acquired half a proportion of water, by being exposed to air for five days.

Carbonate of soda has the same habitudes as the phosphate; it becomes opaque, and loses much water without changing its form, but it never becomes anhydrous.

It results from the observations that some salts lose all their water of crystallization by exposure to air, whilst others retain variable quantities, according to the hygrometric state of the atmosphere. I do not pretend to say that definite quantities of water may not be retained, but only that in the phosphate and carbonate of soda the affinity which connects a certain proportion of water, the seventh, for instance, with the salt, is very little different from that which connects the proportion immediately above or beneath it.—*Annales de Chimie*, xxxvi. 334.

Purification of Alcohol.—A prize was offered by the Royal Academy of Brussels to the person who should prove upon what the differences between alcohol, extracted from various substances, as fruits, grain, roots, sugar, &c. depended. This was obtained by M. Hensmans, who was led, by numerous experiments, to conclude, that the alcohol was always identical, but, that the difficulty, more or less great, always found in rectifying it, as well also as the difference in taste, depended upon the presence of a fatty matter, and a little acetic ether. The fatty matter, when alone, may be separated by several distillations, but the acetic ether is not removed in this way. It is better, in every case, for the removal of both, to add a little caustic potash, or soda, to the alcohol, to be rectified. Carbonated alkali does not act with sufficient energy.—*Bull. Univ.*

NEW WORK.

We have much pleasure in announcing that Drs Wood and Bache are engaged in the preparation of a new Dispensatory, designed as a companion to the United States Pharmacopœia, and which will exhibit a complete view of the present state of Pharmacy. From the known talents and learning of these gentlemen, we are convinced that this work will be a valuable addition to the general stock of pharmaceutical knowledge.

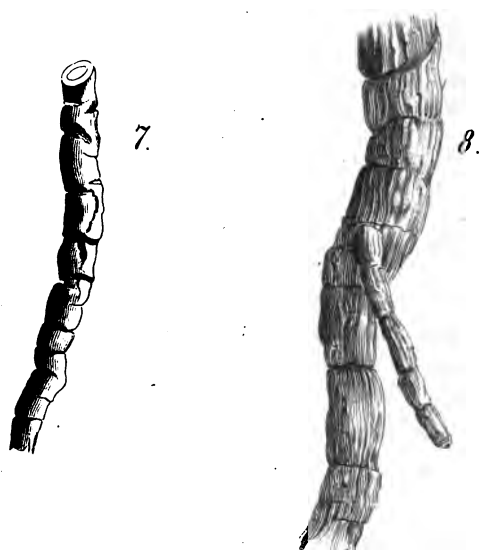
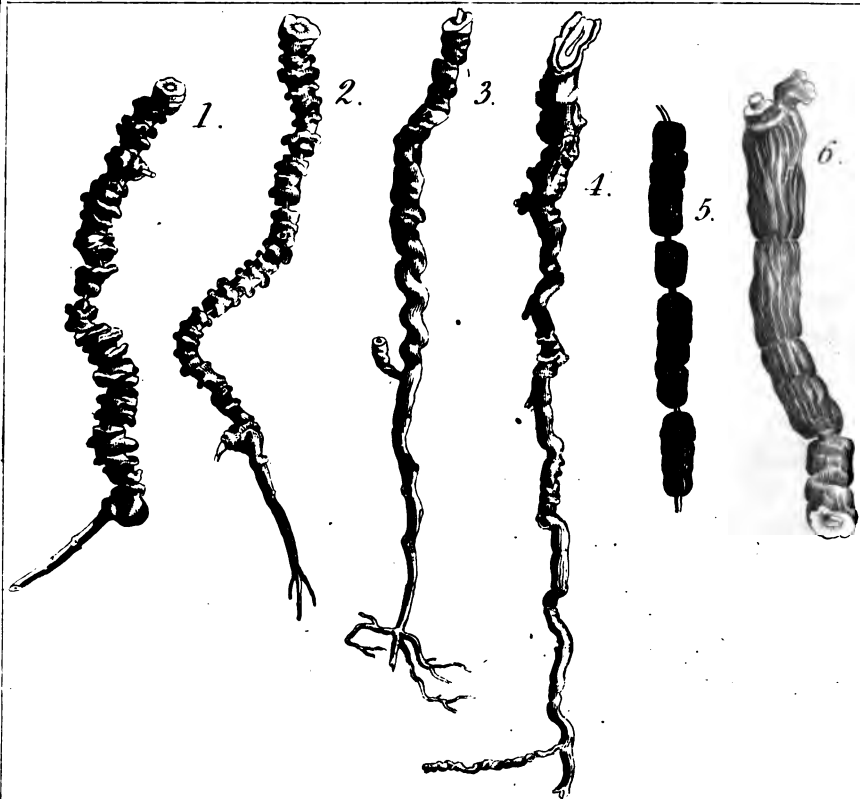
OBITUARY.

DR BENJAMIN ELLIS.

We have the melancholy duty to perform of recording the death of this amiable and estimable physician. A severe attack of scarlet fever, operating on a constitution naturally delicate and impaired by sedentary habits, terminated his life on the 23d of April, in the thirty-fourth year of his age. Dr Ellis was rapidly rising in his profession, and few men were ever more beloved in their circle of intimate friends than he. His manners were simple, unaffected and cordial; and his temper and disposition cheerful, susceptible and generous. He was elected Professor of Materia Medica in the College of Pharmacy as a successor to Dr Samuel Jackson, and filled that station with great reputation and success for four or five years, up to the period of his death. He succeeded in infusing into the minds of the pupils an ardent love for science, and his name will be closely connected with the history of the progress of Pharmacy in this city. As the editor of this Journal, he was diligent and judicious; and his loss has been deeply felt and regretted by his coadjutors.

The modest worth—the mild intelligence and ardent enthusiasm of our deceased friend require at our hands this sincere tribute of respect and affection for his memory.





PHILADELPHIA

COLLEGE OF PHARMACY.

The Lectures in this Institution will commence, as usual, the first week in November, at the Hall occupied by the College in Seventh below Market Street.

The course on *Materia Medica* will be delivered by GEORGE B. WOOD, M.D. It will embrace a concise history of the articles used in or connected with Medicine, and an exposition of their sensible and medicinal properties, their various preparations, and the mode of detecting spurious and sophisticated varieties.

The course on *Chemistry* will be delivered by FRANKLIN BACHE, M.D., and will, in addition to the application of this science to Pharmacy, comprehend a complete series of popular lectures on Chemistry, illustrated by numerous experiments.

There is belonging to the College a large collection of superior specimens of the various articles comprised in the *Materia Medica*, which will be exhibited by the professors to their classes, and are well calculated to add to the interest and instruction of the lectures.

Tickets to both courses may be obtained of Edward B. Garrigues, N. W. Corner of Sixth and Market Streets, or of either of the Professors. By order of the board of Trustees,
HENRY TROTH, *Chairman*.

JOS. SCATTERGOOD, *Secretary*.

AGENTS

For the Journal of the Philadelphia College of Pharmacy.

Boston,	Maynard & Noyes,	Druggists.
New York,	George D. Coggeshall,	do.
Philadelphia,	Samuel P. Griffiths, Jun.	do.
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THE
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OF
THE MEDICAL SCIENCES

Is published quarterly by *Carey & Lea*. Price \$5.00 per annum, payable in advance. The design of this work is strictly national. To insure the proper execution of this design, the Editors have endeavoured to obtain the co-operation of the most distinguished medical men throughout the Union, and in evidence of their success they appeal with confidence to their list of collaborators, among whom will be found Professors Bigelow, Channing, Chapman, Coxe, Dewees, Dickson, Dudley, Francis, Gibson, Hare, Henderson, Potter, Sewall, Warren and Worthington; Drs Daniell, Fearne, Emerson, Griffith, Hays, Hayward, Ives, Jackson, King, Moultrie, Spence, Ware, Wright, &c.

Subscriptions received as above, and by the principal booksellers of every city in the Union.

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JOURNAL

OF THE

PHILADELPHIA COLLEGE OF PHARMACY.

OCTOBER 1891.

Original Communications.

ARTICLE XXVI.—*Notes on Ipecacuanha.* By R. Eglesfeld Griffith, M.D. &c.

THE following notes upon one of the most important vegetable articles of the materia medica, may not perhaps prove uninteresting to such of our readers as have not access to the later works on pharmacology; they have, for the most part, been derived from a paper by Richard in the Dictionnaire des Drogues, and a Memoir by Dr Martius on the medicinal plants of Brazil; from the latter of which we have likewise given representations of the various roots known under the title of Ipecacuanha.

The first account of this article was given by Margrave and Piso in their natural history of Brazil about the year 1648. They speak in the highest terms of it, stating that it possesses emetic qualities, and was considered in its native country to be a specific in diseases of the bowels. Unfortunately, however, the description they gave of the plant

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furnishing it, was so imperfect, that it was impossible to identify it. Notwithstanding the eulogy bestowed on it by these writers, it does not appear to have been introduced into Europe until 1672, when a French physician, named Legras, brought a quantity of it from America, and sold it under the names of *Beconquille* and *Mine d'or*. From having been improperly administered, it soon lost the high character with which it had been invested by Piso and others. In 1686, however, the experiments of Helvetius, and the extraordinary success attending his administration of it in bowel complaints, again attracted the attention of the learned towards it, and it soon became established as one of the most valuable additions to the *materia medica*.

It may be remarked as a curious fact in the history of medicines, that our best remedies have in a vast number of instances met with strenuous opposition and neglect on their introduction, and have been more indebted for their general adoption to fashion, or to some adventitious circumstance, than to a well-grounded conviction of their utility and value. Thus Helvetius obtained his knowledge of the virtues of Ipecacuanha by mere accident. He was a student at Paris, and accompanied a physician by the name of Afforty to visit a merchant named Grenier; the latter recovered his health, and, to testify his gratitude, made Afforty a present of a portion of a new and valuable remedy against the dysentery, which had been sent him from South America. Afforty attached but little importance to the gift, and transferred it to Helvetius, who immediately experimented with it, on several persons affected with bowel complaints, and was eminently successful. Finding that the virtues of the article had not been exaggerated, he published to the world that he was in possession of a certain remedy against diseases of the bowels, carefully concealing, however, the nature of his means. But several of the attendants on Louis XIV. and finally the dauphin himself, being attacked with the prevailing disorder, the king ordered an arrangement to be entered into with Helvetius for the promulgation of his secret, in

consequence of which, the use of this drug soon spread throughout Europe, where it received the highest praise, even from the most incredulous.

The increasing value of *Ipecacuanha* now attracted the attention of adventurers to the new world, and they inundated Europe with a strange medley of roots, possessing various properties, and derived from plants of the most opposite characters, till the term *Ipecacuanha* became a general designation for all roots of American origin endowed with emetic qualities.

Until the time of Linnæus, it was generally asserted that the true *Ipecacuanha* was furnished by a species of violet. About the year 1724, however, the celebrated Mutis, then travelling in New Granada (Colombia), sent to the Swedish naturalist an account of the plant which he supposed to have been referred to by Piso. A description of this was published by the younger Linnæus, in the supplement to the *Species Plantarum*, under the name of *Psychotria emetica*. Its history remained in this unsatisfactory state until the beginning of the present century, when Brotero, professor of Botany at Coimbra, designated the real origin of this useful root. He described and figured the plant furnishing it in the Transactions of the Linnean Society of London, under the name of *Callicocca ipecacuanha*. Notwithstanding this, considerable confusion still existed as regarded other roots, also derived from Brazil, and bearing the same name. In 1802, Decandolle published a memoir, showing incontestably, that the *Ipecacuanhas* of commerce were not only derived from the two plants described by Mutis and Brotero, but also from a great number of others, belonging to different and widely separated genera. This has since been ably corroborated by Auguste St Hilaire in his work on the plants of Brazil, and by the authors first quoted.

The *Ipecacuanhas* of commerce may be divided into two great classes, the *annulated* or true *Ipecacuanha*, and the *striated* or false; this commercial distinction has also the advantage of agreeing perfectly with the botanical differences

between the plants furnishing them. The characters drawn from the colour are subject to so many variations, that they cannot be depended upon; they however may serve to mark the varieties. In this country, notwithstanding our constant communication with Brazil, very little of the false *Ipecacuanha* is offered for sale.

ANNULATED IPECACUANHA.

Cephalis, Swartz.

Swartz. Flor. ind. occ. 1, p. 435. Juss. in Mem. Mus. 1820, p. 402. *Callicocca*, Schreb. Gen. p. 126.

Pentandria monogynia. L. Syst. sex. Familia. Rubiaceæ, Juss.

Involucrum bipartite, containing many bracteated flowers. Proper calyx, small, 5-fid.

Corolla, unfundibuliform, 5-fid. Anthers 5, subsessile included. Fruit, ovate, bilocular, containing two seeds.

C. Ipecacuanha.—Root annulated; stem subsarmentose, ascending; leaves oblong, ovate, scabrous above, pubescent beneath, stipules setaceous; flowers in axillary and terminal capituli, peduncles solitary, reflected.

Ipecacuanha. Piso, Bras. edit. 1648, p. 101. MARGRAV. Bras. ed. 1648, p. 17.

Callicocca ipecacuanha. BROTERO, Trans. Lin. Soc. vi. p. 137. GOMEZ, Mem. sobre a *Ipecacuanha fusca* do Brazil, &c. Lisb. 1801.

Cephalis ipecacuanha. RICHARD, Bull. de la Facul. de Med. 1818, IV. p. 92. Dict. des Drogues, III. p. 256. MERAT, Dict. des Sci. Med. XXVI. VIREY, Journ. Comp. du Dict. des Sci. Med. VI. p. 335. HUMBOLDT, Gen. III. p. 276. MARTIUS, Specimen, Mat. Med. Bras. p. 4.

Description.—Root perennial, simple, and divided into a few divergent branches, flexuose, twisted, entering the earth obliquely, from four to six inches long, about the thickness of a goose quill, much attenuated towards the base and apex, annulated; epidermis glabrous, of a pale fuscous in the re-

cent root, and umber or blackish brown in the dry; the cortex or parenchyma, soft, white and sub-amylaceous in the fresh root, and pale reddish or rose coloured in the dried state, of a shining and resinous fracture, and readily separated from the thin central ligneous fibre. *Stem* suffruticose, from two to three feet long, every where nodose, sending off roots at the knots. *Leaves* four to six, rarely more, oblong ovate, petiolate; leaves at the summit of the stem opposite, those towards the base alternate. *Stipules* erect, adpressed, four to six cleft, deciduous. *Flowers* in a semiglobose capitulum, surrounded by an involucre. *Calyx* adhering to the ovary, minute, obovate, whitish. *Corolla* white, funnel shaped, 5-fid. *Fruit* ovate, obtuse, at first purple, afterwards violet black, containing two seeds. It flowers in January and February, and ripens its fruit in May.

The genuine *Ipecacuanha* is found in moist situations in the thick and shady forests of Brazil, and is most abundant between the 8° and 20° of south latitude. A considerable supply is derived from the valleys of the granite mountains in the provinces of Rio Janeiro and Spirito Santo; it is also gathered in the southern part of the province of Pernambuco. Humboldt mentions that it is cultivated in some parts of South America. That which is exported from St Sebastian is collected in the forests about Cabo Frio, and in the valleys and mountains of Serra do Mar; that sent from Bahia is derived from Comarca dos Ilheos, and the forests on the banks of the Coutas and Peruguacu. Finally, that from Pernambuco is principally found in the district of Alagoas. A small supply is also obtained from the province of St Paul, Maranhão, &c.

This drug forms a very valuable export from Brazil. The price in the sea ports varies according to the distance from whence it has been brought. It is principally collected by the Indians, who, during the two months in which it is fit for gathering, leave their villages almost deserted, and dwell in the woods in which it is found; the consequence is (as is the case with the ginseng in the United States,) that it is almost extirpated in many spots formerly abounding in it.

The plants are pulled up, the roots separated from the stem, washed clean, and tied in small parcels for the purpose of drying. They may be collected throughout the year, but this is generally done from January to March, when it is in flower; this militates against its increase, as it gives no opportunity for the seed to ripen. The Indian tribes, called by the Portuguese *Coroados* (crowned), from the singular manner in which they wear their hair, who inhabit the banks of the river Xipoto in the province of Minas, and the adjoining nation or the Puri, furnish the greatest quantity. The Coroados call the plant *Wosaenda*, whilst it is known by the name of *Muschina* among the Puri. The Portuguese term it *Ipecacuanha* or *Picahonda*; in the provinces of Minas and St Paul, however, it goes by the name of *Poaya*.

The Indian tribes, already spoken of, have a tradition that the medicinal virtues of the Ipecacuanha became known to their ancestors through the wild dog of the country (Gaura). Whenever these animals had drank too freely of the brackish and unwholesome water of the maritime lakes or rivers, they were said to vomit themselves by chewing the stalks and root of the Ipecacuanha.

The genuine Ipecacuanha, as imported into this country, is in roots about the size of a goose quill, of an irregularly twisted and contorted shape, and apparently formed of small, unequal, annular rugæ, of about one line in height, separated by narrow interstices. When broken, they present two distinct parts; a thin ligneous axis or centre, and a thick cortical layer of a brownish colour and resinous fracture, having an herbaceous, acrid, and somewhat bitter taste, with a slightly nauseous odour. The epidermis of the genuine Ipecacuanhas presents several shades of colour, to which much importance was attached in the early Pharmacopœias; it does not appear, however, that there is any material difference in the chemical or medicinal qualities of these varieties, these differences arising, according to Dr Martius, from the respective age of the roots or the mode of drying. As these varieties are spoken of in most of our pharmacological works, a few observations on them may not be superfluous.

1. BROWN IPECACUANHA. (Fig. 1.) This variety, which is also sometimes termed black, is the *Ipecacuanha annelée brun*, RICHARD; *Ipecacuanha gris ou annelée*, MERAT; and the *Ipecacuanha annelée gris noirâtre*, GUIBOURT. This is by far the most common, and is endowed in the highest degree with the peculiar properties for which the drug is valued. Its epidermis is of a more or less dark brown, sometimes even black; its fracture is resinous and of a gray or brownish colour. Martius states that in this variety, the bases of the stalks are frequently gathered with the root; they are about the size of a pigeon's quill, rugose, but not regularly annulated. The brown *Ipecacuanha* was analysed by Pelletier, under the name of *Psychotria emetica*, with the following results:

	Cortical part.	Ligneous part.
Emetine	16	1.15
Fatty matter	2	a trace
Wax	6	
Gum	10	5
Starch	42	20
Extractive matter not emetic	0	2.45
Ligneous fibre	20	66.60
Loss	4	4.80
	<hr/> 100	<hr/> 100

The analysis made by MM. Barruel and Richard, though presenting the same general results, affords some differences worthy of notice, viz.

Emetine	16
Wax, and fatty matter of a different nature	1.2
Resinous matter	1.2
Gum and different salts	2.4
Starch	53
Albuminous animal matter	2.4
Ligneous fibre	12.5
Gallic acid	a trace
	<hr/> 100

The salts found were the sulphate, hydrochlorate and malate of potass, the phosphate and supermalate of lime.

2. GRAY IPECACUANHA. (Fig. 2.) *Ipecacuanha annelée gris*, RICHARD; *Ipecacuanha gris blanc*, MERAT. This variety is distinguished by its epidermis being of a grayish white colour; the rings are wider apart, the fracture is more resinous, and it is more bitter than the preceding. This is supposed by Martius to be the roots of specimens growing in moist situations, and which have been rapidly dried. It is extremely rare, not more than a dozen specimens being found in a bale.

3. RED IPECACUANHA. *Ipecacuanha annelée rouge*, RICHARD; *Ipecacuanha gris rouge*, LEMERY and MERAT. This is annulated like the first variety, but the epidermis is of a brownish red, its fracture is resinous, with a rosaceous tint. It is almost as bitter as No. 2. In most specimens the cortical part is corneous and semi-transparent. Martius observes that "specimens of the *I. brunnea* and *griseo rubens* are sometimes found on the same root, whence it is evident that the colour does not arise from the difference of habitat, as was supposed by Merat, who thought that the former was a native of Brazil, and the latter of Peru.

Pelletier analysed this variety under the name of *Callicocca ipecacuanha*: his results seem to show that it is less active than the brown.

Emetine	14
Fatty matter	2
Gum	16
Starch	18
Woody fibre	48
Loss	2

100

Besides these varieties of the genuine *Ipecacuanha*, there are a great number of other roots, sometimes met with in commerce, known under the same name. It will be impossible for us at present to enter on a detailed description of

the whole of them, we shall therefore confine ourselves to such as are found in Brazil, leaving the consideration of the others for a future opportunity.

The most important of the false Ipecacuanhas is the white or striated; this is furnished by the *Psychotria emetica*, L.

STRIATED IPECACUANHA.

Psychotria.—L.

Pentandria monogynia, L. Syst. sex. Familia. Rubiaceæ, Juss.

Calyx, 5 toothed, superior. Corolla, tubular. Fruit, globular, containing two hemispherical, furrowed seeds.

P. emetica. Stem herbaceous, procumbent, leaves lanceolate, smooth; stipules setaceous; flowers in capillary capituli, peduncles few flowered.

Ipecacuanha, MUTIS. GOMEZ.

Psychotria emetica, LIN. sup. HUMBOLDT, BONPLAND. Gen. RICHARD. Hist. Ipecac.

Description.—*Root* perennial, almost horizontal, cylindrical, about the size of the little finger, with here and there narrow, deep depressions. *Stem* somewhat ligneous, simple, about twelve to eighteen inches in height, somewhat pubescent. *Leaves*, opposite, lanceolate, on a short petiole, and furnished with narrow, acute stipules. *Flowers*, white, small, on axillary peduncles.

This plant grows in Colombia, Peru, and probably in other parts of South America. Humboldt found it in great abundance near the Magdalena. It does not, however, appear to be common in Brazil, as Martius was unable to detect any of it among the large quantities sent to Bahia and other Brazilian ports for exportation. It is seldom if ever brought to this country or to Europe, though it enjoys a high reputation in South America.

As found in commerce, it is in cylindrical pieces about the size of a large goose quill, less twisted than those of the true Ipecacuanha, not annulated, but striated longitudinally, and

presenting at intervals, deep circular depressions. Fracture brownish; slightly resinous, scarcely any smell, insipid taste. The epidermis is of a dirty reddish gray, which becomes blackish with age. The cortical part is soft. The ligneous portion is yellowish, and perforated by an infinite number of minute holes. (Fig. 5, 6.)

M. Pelletier has analysed it with the following results :

Emetine	9
Fatty matter	12
Woody fibre, gum, starch, &c.	79

100

We have adopted the name of striated *Ipecacuanha* for this root, instead of the more common name of white, as there are a variety of others of the spurious kind which were formerly confounded with it under that designation, these have been ably described and figured by Martius, from whose memoir we have drawn up the following abstract. As from the nature of our work we are unable to give representations of the plants themselves, we have merely added a plate of the roots as they are found in commerce.

Many of these white *Ipecacuanhas* are derived from different species of the genus *Richardia*, L. *Richardsonia*, Kunth.

Richardsonia.

Humb. Gen. III. p. 273. *Richardia*, L. Gen. ed. Schreb. p. 230. Juss. Mem. mus. 1820, p. 372.

Hexandria monogynia, L. Syst. sex. Familia. Rubiaceæ, Juss.

Calyx six to eight parted. Corolla subcylindric, six to eight parted. Stamina six to eight. Capsule three seeded.

R. scabra. Stem prostrate or erect, pilose. Leaves ovate or oblong ovate, attenuated at base, pubescent. Capituli many flowered.

Richardia scabra, L. *R. brasiliensis*, GOMEZ.

Richardsonia brasiliensis, VIREY. Journ. comp. dict. med. sci. cum icon. Martius. Spec. mat. med. bras. p. 10.

Description.—Root from four to eight inches long, annulated or subannulated by transverse depressions, and having longitudinal furrows or striæ. Epidermis in the recent root, whitish; in the dry, grayish or pale fulvous, smooth. Cortical part, white, soft, farinaceous, friable, with an acrid and somewhat nauseous taste and smell. Ligneous portion, pale yellow, inodorous and insipid. (Fig. 7.)

There are several other species of *Richardsonia* also furnishing roots possessing emetic qualities, somewhat resembling the above in appearance. It was for a long time supposed that the white *Ipecacuanha* was furnished by the *Viola ipecacuanha*, L. alone, but Dr Gomez, in a dissertation published in Lisbon in 1801, proved that much of it was derived from the plants under consideration; this was confirmed by the researches of MM. St Hilaire and Martius in Brazil. M. Guibourt has proposed the name of *undulated Ipecacuanha* for this kind, as it is not really annulated, but presents an undulated appearance, that is, the depression on one side of the root corresponds to an elevation on the other. The emetic properties of the undulated *Ipecacuanha* are much inferior to those of the genuine kinds, as its analysis by Pelletier demonstrates that the proportion of emetine it contains is very small. This able chemist gives the following as the result of his examination of the cortex.

Emetine	6
Wax and fatty matter	2
Woody fibre	very little

In Brazil, however, it is very highly esteemed on account of its mildness. According to the experiments of Dr J. Gomez in the hospitals of Rio Janeiro, the dose is from one to two drachms, given in the same manner as *Ipecacuanha*.

The *Richardsonia* is found throughout Brazil in sandy dry situations, flowering nearly the whole year.

Another of the spurious *Ipecacuanhas* of Brazil is furnished by some species of the genus *Ionidium*.

Ionidium.—VENTENAT.

Vent. Malm. p. 27. Humb. Gen. V. p. 291. *Solea*, Spreng. *Pombalia*, Vandelli.

Pentandria monogynia, L. Syst. sex. *Violeæ*, Juss.

Calyx five leaved. Corolla five petaled, upper petals small, lower large, carinated, unguiculate or sessile. Stamina five, two lower furnished with a gland at base. Capsule subglobose, trigonal, unilocular, many seeded. Seeds with a caruncle.

I. ipecacuanha. Hairy; stem erect, herbaceous; leaves alternato, lanceolate, acutely serrate; peduncles bibracteate, axillary, solitary; calyx glandular, dentate.

Ipecacuanha branca, Piso, Bras. p. 231.

Viola ipecacuanha et *V. calceolaria*, L. V. Itubu, AUBLET, Guyan. t. 313.

Ionidium ipecacuapha, VENT. Malm. p. 23. MARTIUS, Spec. Mat. Med. Bras. p. 14.

Ionidium itubu. HUMB. Gen. V. p. 296.

Pombalia ipecacuanha, VANDELLI. P. itubu, DECANDOL.

Description.—Root perennial, ligneous, perpendicular, four to six inches long, the old roots about the size of the little finger, the younger about that of a goose quill. The older roots are sulcate longitudinally, the younger smooth, both, however, are marked with deep circular grooves. The epidermis is thin, at first of a whitish colour, and afterwards pale fuscous; cortical portion about a line in thickness, of a starch white colour, and has a heavy nauseous smell; its taste is a disagreeable bitter.

This plant grows in sandy and stony situations in various parts of Brazil, flowering from July to September. It is called *Ipecacuanha branca*, i. e. white vomiting root, by the inhabitants, who prize it as highly as the genuine root. Martius states that he saw large bundles dried and suspended

under sheds for medical use in many places. The mode of using it, is to shave the cortical part from the root and infuse it in water for twelve hours; the dose of this infusion is from half a drachm to a drachm. In this way it is said to act mildly but certainly. The analysis of it by Richard, shows that it contains a very small portion of emetine. The result of his examination is :

Emetine containing a little saccharine matter	3.5
Fatty matter	
Starch	54
Extractive matter soluble in water, containing a new crystallisable principle	22
Woody fibre	19
Gallic acid	a trace.

The above comprises the principal roots known under the general name of Ipecacuanha, which have been recognised in the later works on Materia Medica. The following condensed view of these, as well as other species, which we derive from an interesting paper by M. Lemaire-Lisancourt, in the Memoirs of the Royal Academy of Medicine of Paris (Vol. I. p. 450, et seq.) will present our readers with the present state of our knowledge on the subject. At some future period we shall resume the investigation, and lay before our readers a sketch of such indigenous plants as have been used as substitutes for them.

1. White Ipecacuanha of China. *Ionidium heterophyllum*, VENTENAT. *Viola heterophylla*, POIRET. *V. surrecta*, PLUCKENET. Roots slender, tortuous, whitish, nauseous.

2. White Ipecacuanha of the Galipons. *Ionidium hybanthus*, VENT. *Viola hybanthus*, LINN. AUBLET. *Hybanthus scandens*, JACQUIN. Roots white, slender, tortuous, interlaced, of a disagreeable taste and smell. Called *Pira aia* by the Galipons; and by the Guarinis and other Brazilian nations, *Y cipo ayaca*, or more generally by contraction, *Poaya*.

3. White Ipecacuanha of Guiana. *Ionidium calceolaria*,

VENT. *V. calceolaria*, LINN. *V. itoubu*, AUBLET, JUSSIEU. *Ionidium itoubu*, KUNTH. Roots slender, nodose, tubercular, tortuous, more or less branched, longitudinally striated; colour yellowish gray; odour feeble but disagreeable; taste at first mucous, afterwards somewhat acrid and bitter; emetic in gr. xxx doses, purgative in gr. lx.

4. Ipecacuanha of St Thomas. *Ionidium strictum*, VENT. *V. stricta*, LINN. Roots slender, tubercular, grayish, bitter, slightly odorous, &c. This somewhat resembles the genuine Ipecacuanha in appearance.

5. White Ipecacuanha of St Domingo. *Ionidium polygafolium*, VENT. *V. polygafolia*, LINN. *V. verticillata*, CAVANILLES. Roots fusiform, widely annulated, somewhat fibrous, cylindrical, ligneous, yellowish or grayish; smell disagreeable; taste bitter and acrid.

6. White Ipecacuanha of St Francisco. *Ionidium poaya*, A. ST HILAIRE. This is called in Brazil *Poaya do campo*. Roots tortuous, white, annulated. Dose twenty-five to thirty grains.

7. White Ipecacuanha of Minas-Geraes. *Ionidium brevicaulis*, MARTIUS. Roots sub-oblique, tortuous and flexuose like those of the genuine kind, three or four inches long, slender; epidermis ochraceous, whitish; cortical portion somewhat fibrous, spongy, whitish; taste nauseous. Dose 3ss. to 3i.

8. White Ipecacuanha of Bahia. *Ionidium urticafolium*, MARTIUS. Roots perpendicular, straight, or a little flexuose, three or four inches long, about the thickness of a quill, epidermis scaly, brown.

9. White Ipecacuanha of Peru. *Ionidium parviflorum*, A. ST HILAIRE. *V. parviflora*, MUTIS. *V. emetica*, HUMBOLDT. Root yellowish or grayish, not large; odour nauseous, &c. (Fig. 3.)

10. White Ipecacuanha of Brazil. *Ionidium indecorum*, A. ST HILAIRE. Differs from the following in having more tortuous roots or a more marked gray colour.

11. White Ipecacuanha of Brazil. *Ipecucuanha branca*,

PISO. *V. ipecacuanha*, LINN. *Pombalia ipecacuanha*, VANDELLI. *Ionidium ipecacuanha*, VENTENET. A. St HILAIRE. *Ionidium itubu*, KUNTH. *Poaya branca do campo*, TANNY, JUD. *Poaya da praia* of the natives. We have already described this root (page 192), and mentioned that it is as highly esteemed in its native country as is the genuine kind. (Fig. 8.)

12. White Ipecacuanha of St Paul. *Polygala poaya*, MARTIUS. Root perpendicular, three or four inches long, about the thickness of a quill, widely annulated; epidermis pale yellow, ochraceous, transversely striated; cortical portion white, spongy; taste first sweetish and then bitter. Dose 3i to 3ij. (Fig. 4.)

13. Ipecacuanha of Zoazeiro. *Chiococca anguifuga* and *densifolia*, MARTIUS. *Poaya do sugippe* of the natives. Roots perpendicular or oblique, of the thickness of the finger; epidermis brown, sometimes tubercular; cortical portion tenacious, fibrous; of a peculiar disagreeable acrid fetid smell; taste at first like raw coffee and afterwards acrid, pungent and nauseous.

14. Ipecacuanha of Villa ricca. *Manettia cordifolia*, MARTIUS. Root ligneous, of a dull brown colour, and disagreeable taste and smell.

15. Ipecacuanha of Jamaica. *Spermacoce verticillata*, LINN. Roots slender, striated, undulated, somewhat acrid and bitter. This is a feeble emetic.

16. Rust coloured Ipecacuanha. *Spermacoce ferruginea*. *Poaya de praia*. Roots about the size of a crow quill, brown, ochraceous. Taste and smell nauseous. Dose from thirty to forty grains.

17. Ipecacuanha de la Serra. *Spermacoce poaya*. *Poaya do campo*. Roots rather larger than the last, brown without, and white within, of a taste resembling that of true Ipecacuanha, for which it is substituted in some of the provinces of Brazil.

18. Ipecacuanha del Rey. *Richardsonia rosea*. *Poaya do campo*. Roots tortuous, of the size of a quill, annulated,

white within, and having a violet or blackish epidermis; taste like that of the genuine kind. Dose fifteen to twenty-five grains.

19. Ipecacuanha of St Paul. *Richardsonia emetica*, MARTIUS. Roots five to seven inches in length, slender; epidermis whitish, ash coloured or brown; cortical part soft and spongy; taste and smell disagreeable.

20. Undulated Ipecacuanha. *Spermacoce hexandra*, LINN. *Richardsonia brasiliensis*, GOMEZ. *R. scabra*, MARTIUS. (See page 190.)

21. Striated Ipecacuanha of Peru. *Psychotria emetica*, MUTIS. LINN. *Ipecacuanha grossa*, GOMEZ. (See page 189).

22. Annulated or genuine Ipecacuanha. In addition to what we have said of this root, we have only to add that it is known under a variety of names in the different provinces of Brazil, as Poaya do Mato, Cipo de Cameres, Bexuquillo, Cagosanga, Poaya de Botica, &c.

ARTICLE XXVII.—*Pharmaceutical Notices.*

[We have received the following short notices from one of our most experienced druggists, and have hailed them with great pleasure, not only on account of their intrinsic interest, but also because we are induced to hope, that the example thus set will be followed by many of the profession, scarcely one of whom but has it in his power to furnish analogous facts of extreme value, in the correction of errors and the advancement of truth. We therefore trust, that we shall be enabled to present our readers with a continuation of these notices, in each succeeding number, and that our brethren will not withhold any interesting facts which they may possess, because they may deem them of but little importance; it is only from practical men thus detailing the result of their

experience that the science of pharmacy is to take that rank to which it is justly entitled.]—Ed.

Although it is not in my power to contribute any thing of much interest or importance to your Journal, I have thought that a few extracts from the note book of my shop would not be without value. There are many facts which pass under our eyes without being noticed, or which, if noticed, are soon forgotten. The practice of keeping a shop diary, for the purpose of recording all the chemical operations of the establishment, should be adopted in every well-regulated establishment. If the quantity of every preparation made, the method pursued in preparing it, and the date of the month and year were regularly noticed, much valuable information would be derived from the record. The apothecary would learn the amount of his sales of every particular medicine, and would thus know what quantities it was most expedient to make or purchase at a time. He would ascertain the age of every preparation in his shop, and could thus judge of the effects of time, light, heat and air upon their qualities. If he were also to note all the circumstances of his experiments, every thing unusual and remarkable in their course, he would be gradually adding to the stock of well ascertained facts, and be performing his duties as a member of the republic of science. A book of the kind of which I speak, in order to be complete, should contain a record of experiments upon every chemical preparation placed upon the shelves. The specific gravity of all liquids, trials of the purity of every preparation, and notes of the external characters of all drugs, if regularly recorded, would form an invaluable body of facts and experience to which to recur. A young man who should commence the practice of his profession on this plan, would learn more by a persevering attention to it than in any other way, and could scarcely fail to rank high as a scientific druggist.

After all this prelude, I need scarcely inform you that my own note book is very imperfectly kept. I make a few ex-

tracts from it, more by way of opening the door for a class of communications which it is in the power of *all* our druggists to make to you, and which I am persuaded would much enhance the value of your Journal, than for the sake of any thing valuable or striking that I have to offer.

Tincture of Kino.—I have uniformly found this tincture to become gelatinous, and to lose its astringency after a few months. The Kino I have used appears to be the Jamaica Kino, which is said to be an extract of the *Coccoloba wii-fera*. It is in small irregular deep brown fragments, translucent, and of a rich ruby red at the edges, softening between the teeth and adhering to them, of an astringent and slightly bitter taste, and colouring the saliva of a reddish brown. This is the Kino with which the American markets is chiefly supplied, and it is sometimes imported from the West Indies in a fluid state. Dr Duncan, in the last edition of the New Edinburgh Dispensatory, is the only author I have met with who notices this fact, and he simply states that the tincture of *some kinds* turns out gelatinous. I have evaporated this gelatinous tincture to dryness, and the Kino thus obtained was tasteless and insoluble both in alcohol and water. The Pharmacopœia of the United States very properly rejects it from the list of preparations. The strength of the tincture of the British colleges is three ounces to two pints, or forty-five grains to a fluid ounce. In putting up prescriptions in which this tincture is ordered, it would be better for the apothecary to make an extemporaneous preparation in the above proportions, using finely powdered Kino, than to trust to the tincture on his shelf.

Calcined Magnesia.—The specific gravity of Calcined Magnesia is stated by Hassenfratz to be .235. We find that a four ounce vial will contain about an ounce of the purest and finest magnesia. By long trituration we may increase its specific gravity so much that a four ounce vial will contain four ounces. This is probably the manner in which Henry's Magnesia is rendered so much more dense than that which is usually prepared. It would appear that there is some peculiar colouring principle in this earth; for most of

the magnesian rocks, talc, serpentine, &c. have a greenish tint. To compare small things with great, I have found magnesia to produce in an assafœtida mixture a marked green colour. Timid customers have returned the vial, suspecting that the colour indicated some poisonous ingredients; but repeated preparations made with the greatest care, acquired the same colour after a few hours. The tincture of assafœtida produces this colour as well as the gum. Fine calcined magnesia, fresh from the kiln, has a delicate hue of the purest rose colour when examined in the mass.

Oil of Gualtheria procumbens.—This is the heaviest essential oil of which we have any knowledge; for I have found it to be 1.17. This furnishes us with an easy mode of testing its purity. The wonderful success of Swaim's Panacea has brought this oil into great vogue with all venders of Catholicons, Panaceas, and Syrups of Sarsaparilla. It appears to be a vegetable principle secreted in plants very widely separated by their natural affinities. The *Betula lenta* or Sweet Birch secretes it in its bark; the *Polygala paucifolia* in its roots; the *Spirea ulmaria*, the *Spirea lobata* and the *Gualtheria hispida* in their roots and stalks.

Experientia docet.—Trying the purity of some muriatic acid this day, I was surprised to find that a solution of muriate of baryta produced a copious precipitate, indicative of sulphuric acid. I could not account for this, as the acid had been very carefully prepared in a Wolfe's apparatus, and the gas carefully washed. I kept pouring in the saline solution till I was satisfied that the precipitate could not be sulphate of barytes, and then suspected that I had mistaken acetate of zinc for the barytic salt. But experiment soon showed that this supposition was wrong; the precipitate was anhydrous muriate of baryta—chloride of barium; the water of the solution having been abstracted by the concentrated acid. I afterwards saturated this solution with the acid gas, and could not detect the slightest trace of baryta in it, although the bottle contained several ounces. I thus learned to dilute muriatic acid before testing its purity. The

precipitation of muriate of baryta by strong muriatic acid is noticed by Thenard. I had not at the time met with the passage; it was pointed out to me by my friend Dr Franklin Bache, one of the most accurate and learned of chemists.

Let none be ashamed to acknowledge that they have learned by their own errors, and to acknowledge ignorance when accompanied by a desire to improve. If you like my fragments, you will probably hear from me again.

A DRUGGIST.

ARTICLE XXVIII.—*Observations on certain preparations in the Pharmacopœia of the United States. By George B. Wood, M.D., Professor of Materia Medica and Pharmacy, in the Philadelphia College of Pharmacy.*

The following notes are intended to illustrate some of those formulæ in the last edition of the Pharmacopœia, which having been newly introduced, or considerably altered, may not be readily admitted by the medical and pharmaceutic professions without an inquiry into their merits. It is hardly necessary to urge upon the readers of this Journal the great importance of entire uniformity in the preparation of medicines. The only possible method of accomplishing this object is to unite in adopting some one code of pharmacy, with a determination universally to adhere to its provisions, unless in instances where they may be palpably erroneous or impracticable. In this city the Pharmacopœia of the United States, as revised by the late convention, has been recognised by the College of Pharmacy as well as by the College of Physicians, and the authority of no other code can be generally received. Our hopes, therefore, of attaining the highly desirable end of uniformity, rest entirely upon a practical compliance on the part of the two professions with the regu-

lations contained in this work. It is, however, scarcely to be expected that apothecaries will at once abandon for new or altered formulæ, those to which they and their customers have been habituated, simply upon the ground of authority, and without a conviction on their own part of the propriety and utility of the proposed changes. In the remarks which follow in relation to a few of these formulæ, it is hoped that reasons may be advanced sufficient to justify them in the opinion of our pharmacutists; and nothing more ought to be required to insure their practical adoption in the shops.

Vinum Antimonii.

The points in which this preparation differs from that of the first edition of the Pharmacopœia, are the proportion of the ingredients, and the character of the menstruum. Formerly two scruples of the Tartrate of Antimony and Potassa were dissolved in four fluid ounces of boiling distilled water, to which six fluid ounces of wine were added, so that a fluid ounce of the preparation contained four grains of the salt. At present one scruple of the antimonial is directed to be dissolved in ten fluid ounces of wine, being in the proportion of two grains to the ounce. We shall first consider the propriety of changing the relative quantity of the active ingredient.

The chief object was evidently to render the preparation uniform with that of the British colleges. In the London and Dublin Pharmacopœias, the proportion is two grains of salt to one fluid ounce of menstruum; in that of Edinburgh, it is two grains to the troy ounce. The preparations, though not absolutely identical, approximate sufficiently for practical purposes; and in the United States Pharmacopœia, the proportion has been made to conform precisely with that of the London and Dublin colleges. Among all the nations by whom the English language is spoken, there is a community of literature, which renders it of the utmost importance that the terms employed should have a similar signification. Books written in Great Britain are republished and exten-

sively circulated in the United States; and a difference in the meaning of the same words in the two countries, would lead to inextricable confusion. The medical writings of our transatlantic brethren are not less read and copied by us, within their proper sphere, than those of more general interest; and it is equally necessary, in order to avoid blunders, that the professional terms employed should convey the same idea to the English and American reader. Thus, in the example before us, an English author recommends a certain dose of antimonial wine under certain circumstances, having reference to the preparation as directed by the London Pharmacopœia. His work is republished here, or his recommendation is copied into our own works without alteration; and unless our antimonial wine is essentially the same with that to which he refers, we shall be led into serious errors by following his advice. At any rate, it would be necessary for us in this and all other instances to bear in constant remembrance the difference between the preparations, so as to make the necessary allowances; and it is certainly better that the preparations themselves should conform, than that our attention should be tasked, and our memories loaded with the arbitrary and varying regulations of different colleges. The same reasons which render an identity of meaning in the ordinary terms of our language desirable, wherever it is spoken, apply to medical terms; and if *wine* signifies the same thing in England and America, why should not *antimonial wine*?

These considerations appear abundantly sufficient to justify the reduction in the proportion of the antimonial salt authorized by the convention, unless it can be shown that there is some great and inherent superiority in the preparation as it formerly stood.

We may be told that the druggists were in the habit of uniformly preparing their antimonial wine according to the process of the old Pharmacopœia, and that the people, accustomed to this formula, would complain of a change. But the fact is, that no uniformity in this respect existed in different parts of the United States, or even among the druggists of

the same place. The British Dispensatories, either imported, republished, or somewhat altered and disguised under new names, are widely circulated among us, and their directions have received at least as much attention as our Pharmacopœia of 1820. While many apothecaries and physicians have, in accordance with the latter, prepared their wine with four grains to the ounce, others have followed the former in using two grains; a third set, we are told, have adopted the mean; and we have heard of more than one instance, in which six grains have been employed. Almost any proportion is preferable to this confusion; and it is in favour of the one adopted, that having on its side the weight of the British colleges, it stands the best chance of universal acceptance.

It is not a good reason for declining compliance with the regulations of the Pharmacopœia, that the new preparation would be complained of as inefficient by those who have been in the habit of using the former in domestic practice. Physicians have a right to expect a uniform medicine, and the only guarantee they can have on the part of the apothecary, is an adherence to the recognized standard. Dangerous consequences may result, particularly to children, from the use of a preparation containing more of the antimonial than is calculated by him who prescribes it. I have known death in an infant result from the continued use of small doses of antimonial wine. This is usually kept in families as a domestic medicine, ready for immediate administration in cases of emergency, as in infantile catarrhs and croup, and is very frequently given by the direction of physicians without formal prescription. It is therefore important that there should not be two preparations, one for domestic and another for regular practice, as they would inevitably be in many instances confounded, and frequently to the great detriment of the patient. The question then is, shall regular medical authority or popular opinion be the guide as to the character of the medicine? We might as well ask, shall the artizan judge of the peculiar fitness of his implements, or they who do not pretend to any acquaintance with his business? The

fact is, that very few individuals who purchase antimonial wine for family use would discover the difference. The medicine is generally used in small and divided doses as an expectorant or diaphoretic, or as an emetic for infants; and injury could not possibly be experienced, but, on the contrary, in many instances might be avoided by a diminution of the strength when the preparation is popularly prescribed. It is indeed sometimes called for by adults as a vomit, but in nine cases out of ten the individual would be as well if not better without it, and should he not succeed in producing vomiting with the usual quantity, would ascribe the result to the state of his stomach, as emetics are almost proverbially irregular in their effects. Under ordinary circumstances, Ipecacuanha is much safer than the Tartrate of Antimony and Potassa, and if the apothecary is compelled to sell or prescribe an emetic, the vegetable powder should always be preferred. Besides, even when the antimonial salt is used for this purpose, it is much better given in watery solution, as the vinous vehicle is altogether unnecessary, and might sometimes be an injurious addition.

Another objection which has been started, and in fact must have been in the minds of those who proposed the change, is that by diminishing the proportion of the tartrate, we have more of the stimulant effect of the wine, which is as much as possible to be avoided. But this argument would lead to the use of a saturated vinous solution of the salt; and is not to be weighed against the advantages of uniformity. The proportion of two grains to the ounce has been extensively employed in Europe and this country, and found fully to answer the purposes for which the preparation is intended. Indeed the London college originally directed the quantity of four grains; but in a subsequent edition of the Pharmacopœia reduced the proportion one half. The intention in introducing antimonial wine among the pharmaceutic preparations was to have a solution of tartar emetic which would resist decomposition, and at the same time afford the means of conveniently administering very small doses of that medi-

cine. To meet the latter purpose the proportion of the salt to the menstruum must necessarily be small; and experience has shown that the minute quantity of the vinous fluid contained in a diaphoretic or expectorant dose of the antimonial wine of the Pharmacopœias, can exercise no injurious influence in any case in which a judicious physician would prescribe the medicine. The only use of the wine is to prevent the spontaneous decomposition of the tartar emetic. Is it not probable that the preservative influence of the alcohol is limited to a certain proportion of the salt; and that the larger the quantity of the latter in the wine, the greater would be its liability to decomposition? If such is the case, a preparation containing two grains to the ounce would keep better than one containing four grains; and this argument would alone be sufficient to justify the reduction.

The character of the menstruum is another point in which the preparation of the present Pharmacopœia differs from that of the former edition. Wine is now exclusively employed. The water formerly directed for the solution of the emetic tartar rendered the wine too weak, and the preparation was liable to be injured by time. Nor was the use of water at all necessary, as the pure salt is readily soluble in good wine. The London College, in substituting for the vinous menstruum a mixture of two measures of rectified spirits with eight of water, took care to have a proportion of alcohol quite equal to that contained in the best Teneriffe or Sherry wines. This menstruum has the advantage of containing nothing which could act chemically upon the tartar emetic so as to change its character; but being without colour it might give rise to mistakes, and it is probably more stimulating than wines containing an equal proportion of alcohol. Upon the whole, no fluid answers better in preparing the medicine in question, than good wine, which, while it is sufficiently strong to preserve a due quantity of the salt from spontaneous change, contains no principle which can operate upon it injuriously. Teneriffe or Sherry should be preferred. Inferior wines decompose the antimonial, pro-

ducing insoluble precipitates. Hence, as well as from the impurity of the salt sometimes employed, has arisen the difficulty frequently experienced in making this preparation. Let the apothecary employ crystallized emetic tartar, and good Teneriffe wine, and he will meet with no embarrassment.

Perhaps these observations have been more extended than the importance of the subject might appear to warrant; but the preparation under consideration is one of those which the apothecaries of this city are most reluctant to change in compliance with the Pharmacopœia. It is submitted to their candour and good sense, whether grounds sufficient to justify the alteration have not been presented; and to their public and professional spirit, whether the new formula should not be carried into practical operation.

Emplastrum Plumbi Carbonatis.

This title has been substituted for the unwieldy "Emplastrum Plumbi Subcarbonatis Compositum" of the old Pharmacopœia. There is no occasion for the *compositum*, as there is no other plaster of similar title or composition; and the salt of lead is strictly a *carbonate*, consisting of one proportional of each of its ingredients. The preparation was introduced as a substitute for *Mahy's plaster*, and when properly made answers precisely the same purposes. The directions in the former edition were found upon trial to be altogether inadequate. The oil and carbonate of lead will not unite by the heat of a water bath. By the process as amended in the present Pharmacopœia, a plaster may be prepared, rather too soft perhaps when freshly made, but soon acquiring the proper consistence. Every apothecary should keep this preparation in his shop; and the attention of physicians should be called to its value as a substitute for Mahy's plaster. This is usually spread on both sides of the linen, and is thus very frequently of inconvenient application. It is, besides, not strictly officinal, and should therefore not be countenanced by the profession.

The Plaster of Carbonate of Lead is an excellent application to surfaces inflamed or excoriated by friction, and may be resorted to with great advantage in those troublesome cases of irritated and even ulcerated skin arising from long continued pressure during protracted confinement to one position.

Liquor Morphiæ Sulphatis.

The introduction of Morphia, its Sulphate, and Acetate, were imperiously called for by the deserved popularity of these preparations from opium. The minuteness of the dose of the salts of morphia rendered it very convenient, if not essential, to have an officinal solution, by means of which we might prescribe small quantities without a waste of the material. The sulphate was selected on account of its ready and perfect solubility, and the length of time during which its solution resists decomposition. Water was preferred as the menstruum, because, while it favours but very slightly, if at all, the decomposition of the salt, it never in any way interferes with its medical effect. The proportion of one grain to the ounce was deemed advisable from the facility which it imparts in the regulation of the dose. From one-eighth to one-fourth of a grain being the full dose of the Sulphate of Morphia as an anodyne and soporific, from one to two fluid drachms becomes that of the solution. This preparation is kept in many of the shops in this city, and should be kept in all.

Pilulæ Catharticæ Compositæ.

The object in the formation of these pills, was to obtain a cathartic compound, which, in a small bulk, would unite the properties of efficiency and mildness with a peculiar direction to the biliary organs. Such a purgative preparation is much wanted in this climate, where congestions of the liver and portal circle are so frequent; and as physicians have found no one among the officinal pills calculated to give general satisfaction, they have been much in the habit of

resorting to a patent remedy, by the name of Lee's Antibilious pills, which is considered by many as superior to any similar compound. It is believed that the Compound Cathartic Pills of the present Pharmacopœia will be found upon trial to answer as good, if not a better purpose; and they have the recommendation of being an officinal preparation, neither secret in the character of their ingredients, nor subject to the monopoly of a single individual or family. An explanation of the principles upon which they were formed will perhaps serve to call attention to them.

As smallness of bulk is of considerable importance, both for convenience of administration and for avoiding offence to the stomach, care was taken, in selecting the ingredients, to reject whatever was inert, and therefore to prefer the extract, in which the virtues of a particular vegetable product were concentrated, to the medicine in its natural state. Hence the Compound Extract of Colocynth and the Extract of Jalap are employed, instead of colocynth and jalap themselves.

To secure great efficiency and comparative mildness is another important object. It has frequently been observed that drastic cathartics, combined together in small quantities, retain all their activity as purgatives, but lose much of their power of irritating the bowels. This observation, though originally the result of experience, might easily be shown, were this the proper place, to be in strict accordance with physiological principles. The selection and apportionment of the ingredients of the pills under consideration, were founded upon this peculiarity of cathartic medicines. All the more active purgatives in common use, with the exception of elaterium and croton oil, which were deemed too powerful, are associated together in proportions corresponding to their respective doses. Calomel, Extract of Jalap, and Gamboge are combined with the Compound Extract of Colocynth, which contains Aloes and Scammony with the active matter of Colocynth. As the preparation consists of four immediate ingredients, the quantity of each of these existing in a dose of the pills will be equal to one quarter of its own

ordinary dose. By this arrangement an excess of any one of the purgatives is guarded against; and violent irritation of the stomach and bowels from that cause prevented.

As one of the objects of the pills is to promote the bilious secretion, and thus relieve that congestion of the portal circle which is so common an accompaniment of our febrile diseases, there was a peculiar propriety in introducing calomel among its constituents; and gamboge probably exercises a similar influence.

The name which has been given to the preparation may at first sight seem objectionable, as it might be applied to any compound pills possessing purgative properties; but when it is considered that the ingredients cannot all be expressed in the title, and no one is sufficiently prominent to give a designation to the whole, and that the preparation is intended as the representative of numerous cathartics, and calculated for a wide range of application, the adoption of the name in question may not, perhaps, be considered an inexcusable deviation from the prevalent system of nomenclature.

Three of the Compound Cathartic Pills containing 10.66 grains of the mass are a dose for an adult. In this quantity are four grains of the Compound Extract of Colocynth, three of the Extract of Jalap, three of Calomel, and two-thirds of a grain of Gamboge. A single pill will generally be found to operate as a mild laxative. In a full dose the preparation acts vigorously on the bowels, producing bilious stools, generally without much pain or disorder of the stomach. It has been much used by several physicians of this city, who have found it to produce all the effects which they had been accustomed to obtain from Lee's Antibilious pills, with as little, if not less inconvenience, and in a somewhat smaller dose.

(To be continued.)

ARTICLE XXIX.—Remarks upon “Oil of Cantharidin,”
&c. &c. By Jos. Scattergood.

[Read before the College, Sept. 27, 1831.]

Public attention has recently been called to a preparation of cantharides which is said to contain the vesicating principle in a very concentrated form. As we have not been favoured with the formula for its preparation, and have neither used it nor seen it, we cannot say from actual knowledge whether this is the case or not. It is vended under the name of *oil of cantharidin*, with the proprietor's name affixed, as if it had originated with him. While we cannot avoid awarding to him all the merit which is due for the invention of such a name, we must, in justice to a distinguished chemist, deny him any thing more.

The nomenclature of a science is a compact equally binding upon all who pretend to investigations in it; and every one should consider himself under solemn obligations to maintain it; but more especially those who acknowledge so much devotion to it as to publish the result of their investigations. If departures from this uniformity are permitted, we cannot say how soon the greatest confusion may be introduced.

The article in question purports to be an oil of cantharidin, that is, an oil of the *vesicating principle of cantharides*. Now, every tyro in the science knows that nearly all the proximate principles, whether oleaginous, crystalline, resinous, or gummy, have one name, derived from the common or scientific name of the article from which they are obtained, and generally ending in *ia* or *in*: and, if I am not mistaken, there is not in our whole list one proximate principle which is not itself an oil that contains one as an inherent active ingredient.

Cantharidia or cantharidin is the correct name of the active principle of cantharides, and was *first* obtained in a separate state and its properties examined by M. Robiquet, in 1810, an account of which was published in the *Ann. de Chimie*, tome

LXXVI. He obtained it by the following process. Boil cantharides in water till every thing soluble in that liquid is taken up; then concentrate the solution by evaporation, and when it is reduced to a thick syrup, boil it repeatedly in alcohol until that liquid ceases to act upon it. Evaporate the alcoholic solution gently to dryness, and put the dry residue in a vial with sulphuric ether, and agitate the mixture for a considerable time. At first the ether will seem to have no effect upon it, but after a few hours it assumes a yellow colour. Decant it off, and allow it to evaporate spontaneously in the open air. It deposits small crystalline plates mixed with a yellow matter. Alcohol takes up the yellow matter but leaves the crystalline plates. These plates when dried between folds of blotting paper are cantharidin in a state of considerable purity. He states, that when thus obtained, it is in small plates having a shining micaceous appearance. Insoluble in water or cold alcohol. Boiling alcohol dissolves it, but lets it fall again in crystals as the solution cools. Ether dissolves it, but not very powerfully; it dissolves very readily in oils; and when applied to the skin it acts as a vesicatory with great energy. The solution of it in oils is equally efficacious.

I obtained cantharidin by the above process three years ago; and again a few days ago, I obtained the ethereal solution, but the quantity was so small that the crystalline plates could not be separated. To the energy and efficiency of the mixture of cantharidin and the "yellow substance" M. Robiquet speaks of, (which in this case remained after the ether had spontaneously evaporated) I can bear testimony, as a few drops on linen applied to my arm caused so much pain in less than half an hour that I removed it, and in a short time after a full blister raised. This mixture is readily dissolved in sweet oil, and I have no doubt a solution of this kind would prove a valuable article in cases where quick vesication is required; and by means of it, or the solution of pure cantharidin, paper might be prepared so as to

vesicate with great certainty in one, two, three, four, or five hours, as might be desired.

Sweet oil has long been known as a solvent of the active principle of cantharides. Dr Rousseau informs me, that at least twenty years ago he directed a decoction of cantharides to be made with it, and that it has proved an effectual vesicatory in his practice ever since. A piece of paper saturated with a decoction made by boiling one ounce of powdered cantharides in two ounces of sweet oil* blistered effectually the back of my hand in less than seven hours, and one part of wax and two parts of it melted together forms an elegant light-coloured ointment which produced vesication in about eight hours, and will prove more active, I think, than the ointment of the shops.

Spirit of turpentine has always been considered one of the best solvents of cantharides, and a decoction made with it has long been known as an active article. A small portion of the decoction was evaporated to an oily consistence, and applied to the arm: it vesicated in about three hours. I was much surprised to see in this preparation a large quantity of acicular crystals, the nature and character of which I had not time to investigate: they will form the subject of an interesting inquiry at some future period.†

In experimenting upon other solvents, I find that decoctions in oil of sassafras and cajiput will vesicate in three and a quarter hours, and it is probable nearly all the volatile oils will be found to be equally good.

The haste and circumstances under which these experiments were made, have precluded more than general results; they, however, are sufficient to show that much improvement may be made in our preparations of this valuable drug.

* Dr J. K. Mitchell informs me, that he has used this preparation recently with much satisfaction.

† I find, also, that a tincture of cantharides prepared with ether, and suffered to evaporate spontaneously, leaves a crystalline mass. I had not time to try the virtues of it.

ARTICLE XXX.—*On Salicine, the Active Principle of Willow Bark.* By P. T. Tyson, and W. R. Fisher, Grad. Col. Pharmacy.

[Read before the College, Sept. 27, 1881.]

It is now some time since the attention of our pharmaceutical chemists was directed to the existence of an active febrifuge principle, in the bark of the Willow. We believe it was first noticed by M. Leroux, about two years since, and although supposed by him to be alkaline, yet the further examination of Messrs Gay Lussac and Magendie, satisfied both themselves and M. Leroux that it had no claims to rank as such. Contrary to the usual property of alkalies, it was decomposed by acids and rendered incapable of crystallization. The process given by M. Leroux does not indicate in what character it should be considered. The willow bark is first boiled with a solution of carbonate of potassa, the decoction filtered, the extractive precipitated by sub-acetate of lead, and the excess of lead directed to be precipitated by *carbonate of lime*. To insure the absolute removal of all the lead, sulphuretted hydrogen is next employed. The filtered solution is then evaporated to the consistence of an extract, and treated with alcohol, which, being distilled off, furnishes the salicine in crystals, which are to be purified in the usual mode by boiling with animal charcoal.

This process we tried once or twice, without success, and with the additional experience of one or two of our friends, do not hesitate to pronounce it perfectly incompetent to produce Salicine.

Shortly afterwards, a new formula was offered by M. Peschier of Geneva. He dispenses both with the carbonate of potassa and sulphuretted hydrogen. But our experiments, according to his directions, were not more encouraging than in the former case. To both these processes we have objections. The addition of carbonate of lime to precipitate sub-acetate of lead, appeared at first view rather contrary to

chemical doctrines, and repeated experiments satisfied us that it could not be depended on. Sulphuretted hydrogen invariably detected large quantities of the lead in solution after long boiling with the lime; and we became convinced that the willow bark of our country would not yield salicine by the processes employed in France. Our repeated failures, however, were of some importance in giving us, negatively at least, some idea of the real nature of salicine. We found at the close of each operation that nothing was yielded but a thick viscous liquid resembling molasses both in colour and consistence. We hence inferred that salicine, being neither an acid nor an alkali, must be a principle analogous to sugar, and a subsequent process, founded on this belief, justified the inference.

Knowing that sugar, by the long continued action of heat, was converted into molasses, which resisted all attempts to decolour it, and having found that repeated boilings with animal charcoal had no effect on our treacle of salicine, we gave up all idea of ever procuring this substance by a process which required long boiling with carbonate of lime, and afterwards with animal charcoal. Having adopted the belief that salicine was essentially analogous to sugar in its chemical relations, we proceeded to procure it according to the best methods laid down for extracting that article. The following is the process. A quantity of willow bark reduced to short pieces is to be boiled with caustic lime in water sufficient to cover it. To the filtered decoction, sulphate of zinc is to be added, till it ceases to produce a precipitate. The liquid is again to be filtered and evaporated at a low temperature to the consistence of an extract. This product is to be treated with alcohol so long as it acquires any taste, and finally the alcohol is to be carefully evaporated, when it will yield crystals of salicine. These crystals must be purified by carefully draining off the mother water or rather syrup, and afterwards washing with a saturated solution of salicine. A specimen of the salicine procured by this process is submitted for the cabinet of the college.

With regard to its therapeutic effects, it belongs not to us

to speak. It has already been highly commended by eminent French physicians, and we have submitted some of our own for trial to a medical friend from whom we have as yet received no answer. The properties of this crystalline organic base are already well determined. It has the odour and taste of fresh willow bark, is soluble in both alcohol and water, is insoluble in ether. A more full account of its chemical habitudes and composition may be found in the Journal of this College, pp. 337 and 338, Vol. II., by MM. J. Gay Lussac and J. Pelouze.

SELECTED ARTICLES.

ARTICLE XXXI.—*Peculiar substance discovered in the leaves of the Peach tree (*Amygdalus persica*). By M. Crousseilles.*

I MADE a decoction of dry peach leaves in distilled water, filtered it and added a solution of acetate of lead. The decoction, which at first was blackish, now became coagulated and assumed a dirty grey colour. I permitted it to remain undisturbed for twelve hours, and afterwards filtered it. Almost all the colouring matter remained on the filter, as did also the vegetable fibre and other heterogeneous principles united to oxide of lead.

The filtered liquor was of a beautiful green colour, and possessed a sweetish styptic taste, which I attributed to the acetate of lead it held in solution. By passing a stream of sulphuretted hydrogen through it, I precipitated all the lead, and coagulated this precipitate by heat; I again filtered the fluid, its taste was now slightly acid and tolerably bitter. Then, to remove all the acetic acid, I submitted the fluid to action of fire with calcined magnesia. I again filtered, evaporated to dryness, and treated the residuum with boiling alcohol.

By a slow evaporation, I obtained a grass green liquid of a sirupy consistence, of a taste at first pungent and afterwards permanently bitter, soluble in water and alcohol; however, it appeared to contain a principle which acted like an

oil. I left it undisturbed for several days, hoping to obtain crystals, but they did not form. I again submitted it to gentle heat; the matter assumed more consistence, gave out an herbaceous odour, and lost its green colour.

I finally obtained a residue which I carefully examined, it presented the following characters:

1. It had a gummy appearance; it was solid, brownish, rough to the touch, crystalline.
2. It had a taste at first pungent, slightly saccharine, mixed with bitter (the very small quantity I took acted by producing slight vomiting).
3. It was soluble in water in every proportion, soluble in alcohol, and insoluble in ether.
4. Its alcoholic solution did not appear to affect vegetable blues.
5. Exposed to the air, it strongly attracted moisture and deliquesced.
6. It underwent no alteration in a vessel hermetically closed.
7. A gentle heat, when it was in deliquescence, restored it to its former state.
8. Finally, inclosed in a tube and exposed to the action of hot coals, it gave out a smell of burning vegetable matter, and was converted into charcoal.

I in vain attempted to obtain crystals, by several times treating it with alcohol. I then acted on it by the hydrochloric, sulphuric and nitric acids, and obtained the following results.

The hydrochloric acid dissolved it; the solution, exposed to the action of heat to expel the excess of the acid, formed, when cooled, a yellowish body with rudiments of crystals. This was very soluble in water, and was precipitated by ammonia. Its aqueous solution had no action on infusion of violets.

Weak sulphuric acid acted on it better when aided by heat. This solution when evaporated gave no crystals; if the evaporation was carried too far, charcoal was formed.

Concentrated nitric acid dissolved it unaltered. The diluted acid also dissolved it. This solution, exposed in a glass capsule to the action of heat till a pellicle was formed, gave prismatic crystals on cooling. A tenth of a grain of these crystals placed on the tongue, produced an acid and acrid

sensation on the fauces. Exposed to the action of burning coals, they fused, swelled, and disappeared, leaving a small residue. The alkalies produced a brown insipid precipitate on being added to an aqueous solution of this substance, which precipitate was reduced to charcoal by the action of fire. I found traces of oxalic acid in these crystals.

From these experiments, I consider the substance obtained not as a vegetable salifiable base, but as an immediate principle, to which the medical properties of peach leaves may be attributed, and not to the hydrocyanic acid, as has hitherto been thought.—*Journal de Chim. Med.*, January 1831.

ARTICLE XXXII.—*Observations on Prussian Blue.* By
M. Gay Lussac.

Some of the following observations are due to M. Robiquet, and I only present my own in confirmation of those made by that able chemist.

Prussian blue, obtained by precipitating the chloride of iron by the ferrocyanate of potassium, was several times washed with cold water; nevertheless the water of the last washings was of a yellow colour, and formed a blue precipitated with the chloride of iron. In a subsequent washing with warm water, this was still more coloured; evaporated to dryness, it left a residue which was re-dissolved in water and produced an abundant blue precipitate with the chloride of iron. After several washings, the Prussian blue was deteriorated in colour, and finally became of a reddish brown. At this time, the washings no longer caused a precipitate with the chloride of iron. The residue was only pure oxide of iron; it was not altered by calcination, and no trace of the alkali was discoverable. On the other hand it constantly afforded potash on calcination as long as it coloured

the water, and it did not cease to do this till it was wholly destroyed. It should be remarked that during this change, hydrocyanic acid was disengaged.

From this experiment it results that the purest Prussian blue contains cyanoferruret of potassium, and that water, aided by heat, entirely decomposes it; it yields oxygen to the iron, and hydrogen to the cyanogen. Chloride of iron was added to a solution of cyanoferruret of potassium in excess, and after multiplied washings with cold water, the fluid was examined; it was of a bluish green colour; but on exposing it to heat, it became yellow and oxide of iron was precipitated; it was capable of decomposing a marked quantity of Prussian blue, in addition to that from which it had been taken, and of reducing it to pure oxide of iron.

Another Prussian blue was prepared by adding cyanoferruret of potassium to chloride of iron in great excess. After very numerous washings, the liquid was of a bluish green colour, like the preceding, and presented exactly the same properties.

These two experiments demonstrate that Prussian blue prepared with an excess of cyanoferruret of potassium or of chloride of iron, always yields the cyanoferruret of potassium to water; this fluid at the same time dissolves some of the Prussian blue; but by the action of heat, the blue is decomposed and regenerates cyanoferruret of potassium; which supposes that the washings are alkaline.

It is proved by these experiments that Prussian blue, prepared with the cyanoferruret of potassium and chloride of iron always contains cyanoferruret of potassium. It must be remarked that the washings must be alkaline, as they decompose the Prussian blue and bring it back to the state of a peroxide of iron.

The quantity of potassium, which we suppose to exist in the state of a cyanuret in Prussian blue, appears to be very variable according to the number of washings it has undergone and the mode of preparation. Thus 100 parts of Prussian blue prepared with the cyanoferruret of potassium

and chloride of iron in excess, gave by calcination 1.442 of potass, or 2.004 of cyanuret of potassium; 100 parts of blue prepared with cyanoferruret of potassium in excess, gave 8.684 of the cyanuret of potassium.

Prussian blue obtained with the chloride of iron and the red cyanoferruret of potassium appears identical with the preceding. It gave potass on calcination, and the bluish green washings became yellow by heat, whilst a precipitate of the oxide of iron took place; the fluid had an alkaline re-action, and was capable of decomposing an additional quantity of Prussian blue.

This alkaline re-action in the washings, which in the first instance may have been acid, is very remarkable. May not the solution of the Prussian blue be owing to this excess of alkali, which however is too feeble to decompose it unaided by heat; for M. Robiquet has remarked that the solution commences the moment the liquid ceases to be acid.

Prussian blue prepared with cyanoferruret of potassium and the sulphate of the oxidule of iron in a very slight excess, acts in a different manner. When it was not of a deep colour, the washings scarcely showed any traces of the cyanoferruret of potassium, they did not deposit oxide of iron on heating them, and they did not decompose the smallest portion of the blue. But after it had acquired great intensity of colour by desiccation in the air on plates, the water with which it was subsequently washed became of a bluish green colour, and manifested an alkaline re-action; on heating it, it became yellow, and deposited oxide of iron and decomposed the blue. It then precipitated the chloride of iron of a blue colour in tolerable quantity. This blue furnished 16 per cent of cyanuret of potassium.

When the cyanoferruret of potassium is treated with sulphuric acid, there is, as is well known, a copious disengagement of hydrocyanic acid, and a precipitation of a white powder which resists a long ebullition in sulphuric acid. After having washed it a great number of times with boiling water, a portion of it was exposed to the air, on a plate.

The substance dried, and only assumed a dirty brown tint. Another portion exposed to the air, after having been moistened by diluted sulphuric acid, rapidly became blue; the acidity disappeared completely, and sulphate of potass was formed. Several other portions were successively neutralized by the same portion, and the precipitate became more and more intense in colour.

The white precipitate was calcined at a red heat, and an oxide of iron mixed with carbonate of potash was obtained. A portion was also burnt with oxide of copper, to which a small quantity of sulphate of copper had been added to saturate the potash, and results were obtained which seem to indicate that the white precipitate is composed of

9	proportions of oxygen,
7	" iron,
2	" potassium.

So, that if we suppose 7 proportions of cyanoferruret of potassium which contain

14	proportions of potassium,
7	" iron,
21	" cyanogen,

there will be (in leaving to the iron 7 proportions cyanogen and to the potassium 2) 21 less 9=12 proportions of cyanogen, which will produce 12 of hydrocyanic acid, that is, the four-sevenths of that contained in the salt, and 12 proportions of sulphate of potass will be formed.

The theoretic result is founded on the supposition, that the white cyanoferruret contains enough cyanogen to become blue, and that the potassium will furnish it with what is wanting.

The white cyanuret is consequently formed of

7	proportions of iron,
2	" potassium,
9	" cyanogen;

and if the potassium, in becoming oxidated, yields to the iron, only 7 proportions of iron and 9 of cyanogen will remain, which is combined as follows to form the blue.

3 proportions of cyanuret of iron,
 4 " cyanide of iron.

To verify the theoretic composition of the white cyanoferruret, three grammes were decomposed by calcination, and there was obtained

Peroxide of iron, 1.520 grammes,
 Potassium, 0.431 "

There should have been found 1.625 grammes of oxide of iron and 0.465 of potassium; but it should be remarked that the two first numbers are nearly in the same relation as the two last; proving that the salt exposed to calcination was not perfectly dry.

During the action of the sulphuric acid on the cyanoferruret of potassium, it did not dissolve the iron; this metal remaining undiminished in the white cyanoferruret.

The cyanoferruret of copper gave 6.7 per cent of cyanuret of potassium; that of silver 9.3.

The cyanoferruret of lead, after a considerable number of washings, still yielded a small portion of cyanoferruret of potassium to the water, coloured it yellow, and gave it the property of producing a blue with the chloride of iron; potash was also found in this salt, but in less quantity than in that of the silver, and a portion remained combined with the oxide of lead. The presence of potassium in the cyanoferruret of lead prevents the hydrocyanoferric acid from being obtained pure from it, by decomposing it by means of sulphuretted hydrogen, according to the plan of Berzelius. The procedure of Robiquet is in this respect far preferable.

Neither can the hydrocyanoferrate of ammonia be obtained by decomposing the Prussian blue by ammonia; after having exposed it to the action of heat, much cyanuret of potassium was found in the residue.

The cyanoferruret of lead, exposed to the action of heat, presents a phenomenon which merits notice. At first azote was obtained mixed with cyanogen, and hydrocyanate of ammonia. The matter, although red and losing nothing, suddenly became incandescent, and disengaged almost instantly a great quantity of azote. The residue, cooled with-

out being exposed to the air, was black ; it was pyrophoric at a few degrees above the ordinary temperature, and gave out ammonia in abundance in a moist air ; it also produced much of this, with vapour of water at a red heat. After the spontaneous inflammation of the black matter, there remained a combination of 2 proportions of oxide of lead and 1 of oxide of iron, of an orange brown colour and very fusible under the blow-pipe. The strong incandescence which manifests itself during the calcination of the cyanoferruret of lead is certainly an indication of the formation of a new and very intimate combination. But what is this combination ? We shall learn from new experiments.—*Annales de Chimie*, January 1831.

ARTICLE XXXIII.—*Observations on the Sennas, and especially on that called Moka.* By M. Fée.

The pharmaceutical history of the Sennas is still involved in obscurity as regards their origin. It is well known that the Alexandria senna is obtained from the *Cassia acutifolia*, that the Aleppo is procured from the *C. obovata*, and finally, the senna de Palthe is a mixture of the two last, or, in other words, of the leaflets of the *C. acutifolia* and *obovata*, adulterated with those of the *Cynanchum arguel*; as to the Tripoli and Moka sennas, also termed Indian and Senegambian, but little is known of the plant which produces them.

Having had occasion during my annual visits as one of the medical jury to examine a great number of different packages of senna, I have thought I might throw some light on this part of pharmacology.

In attributing, in my pharmaceutic natural history, all the sennas of commerce to the *C. acutifolia*, *obovata*, *lanceolata* and *elongata*, I at the same time remarked, that if the

Tripoli senna was derived from the *C. acutifolia* gathered in Sennaar, the locality caused it to differ from that obtained from the same species above Assouan; I also observed, when speaking of the Moka senna, that it did not appear to me that it had been proved to differ from the Indian; it is these doubts, which I entertain in common with many esteemed authors, which I shall endeavour to dissipate.

A comparative examination of the Tripoli senna with that from Alexandria, demonstrates that the leaves of the former are shorter, more fragile, rather more tomentose, with less prominent nervures, and of rather a brighter colour; that its follicles are shorter, thinner, less regular in form, and of a pale yellow; moreover, the nervatures of the leaves and seed vessels are precisely similar to the Alexandrian; hence the slight differences just pointed out are neither sufficient to constitute a species, or even to establish a variety. These two commercial kinds have certainly the same botanical origin; but if we agree with authors on this point, we differ from them in their opinion of both kinds being furnished from the same locality. It is known that the *C. acutifolia* is very abundant in Upper Egypt and Sennaar, that it is brought thence to Boulac, and passes into the hands of the viceroy's (of Egypt) agents, who pay no regard to the difference of locality; they mix some of the different kinds, thus forming senna de Palthe, whilst the remainder is sent to Europe under the name of Alexandria senna. But, if it were true that some of the senna was transmitted from Sennaar to Tripoli, would we not receive from both this place and Egypt similar articles, which is never the case. The leaves of the Alexandria senna are always mixed with some of those of the *C. obovata*, and even of the *C. absus*, as these two species also grow in all parts of Egypt which produce the *C. acutifolia*; and if these are not found in the Tripoli senna, it must arise from their not growing in that part of the country, or else being very rare.

As it is by no means proved that there is any difference between the senna of Bicharia and that of Sennaar, both of

which are furnished by the *C. acutifolia*, how can it be supposed that the Tripoli senna, which is so different from the Alexandria as to be recognisable at the first glance, is derived from the frontiers of Nubia and the right bank of the Nile. What advantage would accrue to the dey of Tripoli to bring it from a considerable distance across deserts, and which, having passed through several hands, is afterwards sent to Europe, and sold at a lower price than that at which it is afforded by the viceroy of Egypt. Commerce is not thus carried on, even in countries where civilization is less advanced than with us.

There is another objection, derived from the appearance of two sennas produced by the same plant in different localities, since the principal form of the leaves and seed-vessels is not sensibly altered; these two sennas are evidently the result of a more vigorous vegetation, which has occasioned an increase in the size of these parts, and given them a firmer consistence and higher colour, &c. Now, may it not be reasonably supposed, that the climate of Upper Egypt is capable of bestowing a vigour on the *C. acutifolia*, which is not to be seen in individuals of the same species growing in Sennaar, a country nearer the line than Bicharia.

But a single traveller has pretended that the Tripoli senna comes from Sennaar, and as travellers are not obliged to furnish proofs of the truth of their assertions, the *ipse dixit* of this individual was believed; in a short time a multitude of persons repeated his assertions, and it assumed a rank among received truths, because in adopting it, each author supported it with the weight of his authority.

We think that we have fully proved by what has been said, that the Tripoli senna is not derived from Sennaar, a country separated from Tripoli by burning deserts, and a distance of near eight hundred leagues. Why, when this impossibility is admitted, not suppose that the *C. acutifolia* grows in Tripoli, since the *C. obovata* is found on the other side of the Red Sea, and even in Syria, on the other side of the Nile, as far as Senegal? If the locality of this species is

so extensive, why limit the *C. acutifolia* to the borders of the Nile? By admitting this hypothesis, the slight differences between the two kinds can be readily explained, which, arising from the vigour of the vegetation, must be in favour of that from Sennaar over that from the Mediterranean territory of Tripoli, and all will agree on this point.

Let us now examine the Moka senna; a variety known under different names and derived from various localities. It generally arrives sorted; sometimes, however, it comes to Europe untouched. This has enabled me to find fragments of branches in tolerable preservation, some of which had the seed vessels attached, and others the leaves.

I will successively describe the leaves of this senna, and the general petioles of the pods; I call the plant which furnishes them *C. elongata* (Lemaire), and will hereafter state why I prefer this specific name to that of *lanceolata*.

1. Leaves of the *C. elongata*. Elongated, narrow, thin and flexible, obscurely mucronate, oblique, petioles short; petiole somewhat thick, median nervure ligneous; secondary nervures almost articulated; upper surface with a few scattered hairs, of a pale yellow, the secondary nervures more prominent than the median; lower surface smooth, median nervure more prominent than the secondary.

Length 12—20 lines. Breadth 3—5 lines.

Odour very strong, similar to that of the other sennas, and a little like that of tobacco; taste herbaceous, nauseous and a little bitter; colours the saliva of a yellowish green.

2. General petioles of the leaves of the *C. elongata*.

Long, thin, arcuated, superiorly smooth, marked by a longitudinal furrow on the upper part, and slight striæ near the furrow, arising from cicatrices indicating the attachment of the partial petioles; they are double, close to each other, each set of leaflets about 8 to 10 lines from each other; there are about five pairs of them.

Length 24—40 lines.

Odour and taste similar to that of the leaves, but in much less degree.

3. Pods of the *C. elongata*.

Thin, smooth, shining, a little arcuated, of an olive green at the edges, blackish at the centre, above which are impressions showing the situations of the seeds : these are from 5 to 7 in number, heart-shaped, rough, and reticulated ; nervures anastomosing, thicker near the sutures than at the centre ; surface studded with white points (a simple discoloration of the tissue, only visible under a lens), summit rounded, point situate below the curvature, marked tenuity towards the edge which is attached to the peduncle. When this latter resists attempts to detach it from the branch, it becomes bent and as if articulated.

Length 18—24 lines. Breadth 7—9 lines.

Odour rather slighter than that of the leaves. Taste nauseous, very disagreeable, causing a slight sensation of heat in the mouth, no bitterness ; they colour the saliva of a yellowish brown.

The proportion in which the leaves, footstalks, and pods occur is as follows :

Leaves,	93	parts,
Footstalks,	6	"
Pods,	1.100	

The question now is, to what species of cassia does this belong ?

The Moka senna has been attributed to the *C. lanceolata* of Forskhal ; but this species is too closely allied to the *C. acutifolia* for this opinion to be admitted. Authors have separated it to again unite it, and this has been repeated several times. This contrariety of opinion shows that the plant is still imperfectly known. The most marked difference pointed out by M. Delille is the presence of glandular petioles ; and the species under consideration has no glands at the base of the petioles, for the dilatation at this place is certainly no gland. We therefore prefer, in the state of doubt in which we find ourselves, retaining the appropriate name of *elongata* given to the Indian senna by M. Lemaire,

and we will complete the description he has given of it. (Journ. Pharm. vii. 345).

Cassia elongata. Lemaire. Fee. Cours d'histoire Naturelle. Pharm. II. p. 69.

Foliis subquinque jugis, elongatis acutiusculis sub mucronatis, petiolo abbreviato, turgido eglanduloso; fructibus glabris, nitentibus, subarcuatis, apice obtusissimo, mucrone inferiore; 5—7 spermibus seminibus difformibus, rugosis; rugis nitentibus, reticulatis, carcalo recto subelevato.

Habitat in Arabia, necnon in Senegambia an etiam in Indiis.

Should the Moka, the Indian and the Senegambia sennas be regarded as distinct? Certainly not, for the most practised eye cannot discover any difference between them. It is not even proved that the *C. elongata*, which furnishes the whole of them, grows in all the localities from whence it is sent to Europe. According to the inquiries I have made, the senna which comes from Moka or Senegambia direct, is generally sorted, and is larger in its proportions, whilst that from India is not sorted, and has rather narrower leaves; but except these slight differences, it must be allowed that the state in which the leaves and pods are found in our shops, wherever they may have been brought from, is exactly the same.

But to conclude. The sennas which we receive from Alexandria and Aleppo are derived from cassias which grow in Egypt, Sennaar or Syria; that which comes from Tripoli grows in that regency.

The slight physical differences discoverable on a comparison of the leaves and pods of the Alexandria senna with those of the Tripoli, is explainable by the difference of locality.

The Moka, India, and Senegambia sennas are identical in their physical properties. They are produced by the same species of cassia, which appears not to be the *C. lanceolata* of Forskahl, but the *C. elongata* of Lemaire.

It is by no means proved that the Moka senna, to which

the name of long leaved senna is correctly applied, grows in all the localities from whence we procure it. We will conclude by observing, that if it were true, as several practitioners have asserted, that the long leaved senna purges as well as the senna de Palthe, or the Alexandria and their follicles, it ought to be preferred to all others, as it is less easily adulterated, and it may be readily freed from admixture of other plants, which cannot be completely effected with senna de Palthe, and hence there would be no danger from the cynanchum, or from the redoul, which is still more dangerous in its effects.—*Journ. de Chim. Med.*, April 1830.

ARTICLE XXXIV.—*Observations on the Extraction of Morphine by means of Alcohol and Ammonia. By M. Reginbeau, Sen., Pharmaceutist, Montpellier.*

A great variety of methods of procuring morphine have been successively published, but the mode which has succeeded the best with me is that indicated by M. Guillermond of Lyons in the *Journal de Pharmacie*, August 1828. Advantageous as regards the facility with which it affords a large quantity of the salt, it is still susceptible of modifications which will enable us to obtain this vegetable base uncoloured, and almost wholly freed from narcotine. M. Guillermond's plan is as follows:

“Take two pounds of opium, pound it as fine as possible, infuse it in eight pounds of cold alcohol at 30°, frequently agitating the vessel containing it; after digesting for three days, strain through a cloth; treat the marc with two pounds of the same menstruum; strain this second infusion and add it to the first. To this filtered solution add two ounces of ammonia and stir it well; the liquid assumes a slightly turbid

appearance; let it remain at rest for two or three days, after which it is to be filtered; the sides of the vessel will be found studded with crystals, which are to be detached and thrown on the filter. If they be dried they will be found to weigh four ounces, four drachms; they are of a brown colour; they are to be washed with water, which dissolves the colouring matter as well as the meconate of ammonia, and leaves the crystals of morphine of a light reddish colour; when they are carefully dried they weigh two ounces, four drachms."

M. Guillermond considers the crystals as almost pure morphine, and as not containing more narcotine than when obtained by other processes. Desiring to ascertain how far this assertion was correct, as M. Guillermond does not say what becomes of the narcotine in his operation, I repeated the process of this pharmacist on four ounces of opium.

Experiment 1. A solution of 3iv of opium was made in 3xx of alcohol at 30° .^{*} This solution was filtered and treated by 3iv of ammonia at 22° , double the dose indicated by M. Guillermond.[†] The fluid assumed a turbid brown tint, and rapidly formed very brilliant crystals. After standing undisturbed for three days it was filtered, the crystals were detached and thrown on the filter; when dried they weighed 3iv .[‡] They were of a reddish colour; after being reduced to powder, washed in cold water, and carefully dried, they only lost a few grains in weight. The fluid with which they had been washed was slightly coloured.

^{*} This solution was prepared by the above mentioned plan, as were all the solutions hereafter spoken of.

[†] This quantity of ammonia appeared to me to be necessary to precipitate all the morphia of the opium on which I operated. After having employed half this quantity, the fluid scarcely darkened turmeric paper; it was somewhat turbid, and did not immediately precipitate crystals. M. Hottot indicates, in his process with water, these same proportions of alkali to treat certain qualities of opium, rich in active principles, but generally he employs the doses recommended by M. Guillermond (two drachms of alkali to four ounces of opium). This latter does not state the strength of the ammonia he employs.

[‡] M. Guillermond obtained from the same quantity of opium a precipitate weighing four drachms and a half, which was reduced to two drachms and a half by washing with cold water.

The product of this process, according to M. Guillermond, is almost pure morphine; however, every thing led me to believe that it contained, without speaking of the sub-meconate of ammonia, which is not very soluble in cold water, a marked quantity of narcotine. To obtain pure morphine from it, I successively treated it with several doses of boiling alcohol at 36° , in order to perfectly dissolve it, and I obtained from each solution on cooling, morphine nearly freed from narcotine. The alcohol of the second and third treatment was almost colourless, and deposited the morphine of a very white colour, rendering it unnecessary to bleach it by means of charcoal.

The alcoholic solutions from which the morphine had been separated, necessarily contained the narcotine and the sub-meconate of ammonia; for both those substances are more soluble in alcohol than the morphine. To precipitate the narcotine from the solution, I diluted this with distilled water till it marked 14° B., knowing that the sub-meconate of ammonia would still remain in solution. The narcotine was precipitated in a slightly brilliant powder. After permitting it to deposit, it was thrown on a filter to separate it from the alcohol. When dried, it weighed gr. lvij. This experiment confirms the assertion of M. Thenard on the greater solubility of narcotine in alcohol than of morphine, a fact denied by some esteemed authors.

The greyish powder thus obtained still contained some morphine, as was proved by the red colour it assumed when tested by nitric acid, though the quantity was very small, and it was easy to show that the substance was almost wholly composed of narcotine; for if it be placed on blotting paper and exposed to a moderate heat, it liquefies and is imbibed by the paper, like melted rosin. It is also very soluble in the essential oils, both of which characters it is well known distinguish narcotine. It may be remarked, however, that this same narcotine was not entirely soluble in ether, which indicated that it was not perfectly pure. It may contain, besides the morphine, some colouring matter.

Thus 3iv of opium treated by the process of M. Guillermond, furnished me with 3iv of what that operator considered as almost pure morphine, and which nevertheless, as has been shown, lost half its weight by the alcoholic treatment I subjected it to, and gave, as a definitive result, but 3ij of morphine, which was previously combined with gr. lvij of narcotine and the sub-meconate of ammonia which remained in solution in the diluted alcohol.*

Experiment 2. In a second operation, a solution of 3ij of opium in only 3viii of alcohol instead of the 3x employed by M. Guillermond, was treated by 3ij of ammonia; this gave a precipitate weighing 128 grains; this precipitate, when washed with cold water, lost one fourth of its weight, so that it was reduced to 96 grains. This product, treated with boiling alcohol, furnished on cooling 64 grains of crystallized morphine. This morphine was not very white, and not entirely soluble in acetic acid, like that of the first experiment. The alcohol from which it was precipitated was diluted with water, and deposited the narcotine, which when dried weighed 24 grains.

The results of this last operation differ from those of the preceding in several particulars. 1. The precipitate was proportionally less abundant than that of operation No. 1. 2. This precipitate, when washed in cold water, lost one fourth of its weight. 3. Finally, the washed precipitate, having been treated with boiling alcohol, also gave proportionally less pure morphine and less narcotine.

Struck with the difference of the results of the two operations I have detailed, results which also differ from those obtained by M. Guillermond, and desirous of ascertaining how far the doses of alcohol and ammonia were capable of influencing the phenomena, I made the following experiments.

* From some experiments, I am satisfied, that the alcoholic tincture to which the ammonia has been added, from which the precipitate furnishing the morphine has been obtained, does not contain any sensible portion of this latter substance, or of narcotine. The same may be said of that part of the opium which is insoluble in the alcohol.

1. A solution of 3ij of opium in 3i 3ij of alcohol, was treated with gr. ix of ammonia, and gave a precipitate weighing gr. xv. This precipitate washed in cold water lost gr. iij, the remaining gr. xij being the almost pure morphine of M. Guillermond; but this morphine, as we have already shown, is still united with narcotine, and perhaps also with a little sub-meconate of ammonia, which could not be removed by the cold water. To separate the morphine, entirely, I dissolved the above mentioned product in boiling alcohol; this solution on cooling deposited gr. viij of well crystallized morphine, though somewhat coloured.

2. The same quantity of opium (3ij) dissolved in the same manner, in the same quantity of alcohol (3i 3ij), was heated with gr. xvij of ammonia instead of ix: the precipitate weighed gr. xvij. Washing in cold water caused a loss of gr. iij. This last product of gr. xiv was subjected to the action of boiling alcohol; which furnished on cooling gr. xij of dry, well crystallized morphine, but rather more coloured than No. 1.

It results from a comparison of the two operations I have just detailed, that a determinate quantity of an alcoholic solution of opium, treated by the dose of ammonia indicated by M. Guillermond, gives a smaller precipitate than an equal quantity of the same solution treated by a double dose of ammonia; the two precipitates when washed in cold water, lose the same weight; but, as the procedure of M. Guillermond terminates with this washing in cold water, it is evident, that the use of this plan will give an impure product, whether the alcoholic solutions of opium be treated by the indicated dose of ammonia or by double the quantity.

If the two precipitates are subjected to the action of boiling alcohol, that produced from the solution treated by the double dose of ammonia, gives 33 per cent more of crystallized morphine than that in which a less dose of the volatile alkali has been used. Instead of acting on the 3ij of opium with 3i 3ij of alcohol, as in the preceding experi-

ments, I made two other solutions in employing but 3i of alcohol to the 3ii of opium.

3. One of these solutions treated with gr. ix of ammonia, furnished, as in No 1, a precipitate of gr. xv, which after being washed in cold water was reduced to gr. xij. These gr. xij, after the action of boiling alcohol, gave gr. ij of very white crystallized morphine.

4. A precisely similar solution of opium, treated by gr. xviii of ammonia, gave a precipitate of gr. xvi, which after being washed in cold water was reduced to gr. xii; the washed precipitate treated with boiling alcohol furnished gr. viii of crystallized morphine, less white than No. 3, but less coloured than No. 1 and 2.

In the two last experiments, as in those which precede them, the precipitates obtained by the different doses of ammonia were of the same weight within one or two grains; they also experienced about the same reduction by washing with cold water, and the product in morphine of that which resulted from the action of one dose of ammonia was 25 per cent more than the other; but if the product in morphine of No. 3, in which a solution of 3ij of opium in 3i of alcohol was treated with gr. ix of ammonia, be compared with that of No. 1, obtained by the action of the same quantity of ammonia on a solution of opium made with a larger quantity of alcohol, it will be seen that this latter product is more considerable than the former. The same may be said of the 2d, which is larger than the 4th.

From those experiments it follows, that an augmentation in the product of pure morphine is obtained, either by augmenting the quantity of alcohol employed to dissolve the opium, or in enlarging the dose of ammonia used to precipitate the morphine, so that when a small quantity of alcohol is used as a menstruum and a larger dose of ammonia, the same results take place. Ex. 1 and 4.*

The morphine I obtained from each of the four experi-

* This requires confirmation, for a great excess of ammonia redissolves the morphine.—*Note of French Editor.*

ments just detailed, was more or less coloured; this colour is evidently owing to a foreign principle, which may be furnished by the water of crystallization; for I have remarked that the morphine was higher coloured in proportion to the regularity and perfection of its crystallization, and the abundance of the alcoholic fluid in which it was crystallized.

When this fluid was employed in a less quantity, the crystallization was confused, and the morphine was much whiter. The same results took place when the evaporation was pushed too far.

Can the water of crystallization (if any exists in the morphine), as well as the colouring principle, foreign to this substance, be the only causes of the difference to be observed in the weight of the products of the different experiments? To be assured on this point, it is necessary to make fresh examinations, by acting on large quantities of opium, two drachms being too small to give precise results.—*Journal de Pharmacie, April 1831.*

ARTICLE XXXV.—*Notes on Salicine, Jalapine, and Cetra-
rine. By M. E. Herberger of Munich.*

I undertook with Professor Buchner a series of experiments on the nature of salicine, as it was described in a state of purity by M. Leroux. We assured ourselves that this substance, generally considered as simple, is compound, and we have even been able to separate from it an alkaloid constituent principle and a sub-acid.

The basal principle of the salicine of M. Leroux possesses the properties of a true alkaloid, except that it dissolves with facility both in alcohol and distilled water. We burnt a portion without being able to detect any appreciable residue. This principle is principally distinguished from the

common salicine by its alkaline reaction on litmus paper, by its crystalline form, which, however, is prismatic ; by its solubility in water being greater than that of common salicine, whilst absolute alcohol acts more energetically on the latter ; and, finally, by its reaction both on the concentrated and diluted acids.

The salts we have prepared with it are, the sulphate, the nitrate, the phosphate, the acetate, the tartrate, the oxalate, and the hydrochlorate. All these salts are more or less soluble in absolute alcohol ; but sulphuric ether does not dissolve the slightest fraction ; during the evaporation of the alcohol, they separate (from the absence of water of crystallization), in a pulverulent, flocculent, and sometimes mammillated form. Treated before a blow-pipe, they first melt in their water of crystallization, then become dry, and afterwards again melt at a high temperature, giving out a peculiar odour, like that of burning quinine, and leave a light charcoal which may be entirely dissipated by an augmented heat.

Moreover, the capacity of saturation of the true salicine is very small, and but little superior to that of the sub-alkaloids.

All the salts above spoken of, except the acetate, crystallize in prisms, sometimes presenting superb forms. The acetate was obtained in a granular state. Several of these combinations rapidly effloresce : their taste is generally bitter without acidity. The salicine whose characters I have just given, was obtained by the following process : common salicine was dissolved in a solution of oxalic acid, and this acid afterwards separated by lime, &c.

But we were not content with obtaining the base of this salt ; we also separated the sub-acid portion, by treating it with phosphoric acid at a moderate temperature. This acid substance, which is the cause of the aromatic smell of the common salt, and from which the true salicine is perfectly free, may be obtained by distillation. It possesses all the properties of a sub-acid. However, the true salicine does

not possess any therapeutic powers superior to those of the compound salt, and is merely interesting in a scientific point of view

The *resin of jalap* also occupied our attention; and we have been fortunate enough to separate from it a constituent sub-alkaloid principle, and a sub-acid, by means of acetate of lead. The solution of the resin in alcohol was treated with an alcoholic solution of acetate of lead; it formed a slight precipitate composed of oxide of lead and the resinous sub-acid under consideration, whilst the acetic acid combined with the resinous sub-alkaloid, forming a sub-acetate, a combination from which it was easy to separate the jalapine in a pure state.

This is colourless, as transparent as glass, scarcely soluble in boiling water, but readily so in alcohol. It is also dissolved by concentrated acetic acid, especially when aided by heat, and in a less degree by sulphuric, hydrochloric, or phosphoric acids, forming with them combinations, which, though not entirely neutral, are colourless, inodorous, and possessing more or less taste. We have not yet been able to procure it in a crystalline state.

Cetrarine is a bitter, sub-alkaline principle found in the *Cetraria islandica*. In treating this lichen with boiling water, till no more bassorine or gummy matter is separated, it at last becomes freed from the bitter principle. The decoctions are then evaporated after having been filtered, the residue is treated with cold water and again filtered, and the fluid reduced to the consistence of an extract which is to be subjected to the action of boiling alcohol. This tincture is then to be concentrated; the residue to be washed with cold ether, and finally with acetic acid to remove a slight admixture with a salt of lime. It now only remains to again wash with cold water, which, however, must be done cautiously, to obtain the *cetrarine* almost colourless, having only a slight gray tint; it has a peculiar, but extremely bitter and penetrating taste. Its smell is scarcely perceptible. Subjected to the action of boiling water, it first softens, as

suming the consistence of wax; afterwards, in becoming liquid, it turns brown and swells, exhaling empyreumatic acid vapours, and finally leaves a carbonaceous residue which may be volatilized by aid of an elevated temperature, with the exception of a small residue.

The cetrarine which has already been prepared by the illustrious Berzelius in a more simple manner, but which he did not procure entirely pure, is almost insoluble in cold water, though, from the intensity of its bitter, it communicates this taste to the fluid. Boiling water takes up more of it; but it should not be exposed to the action of heat for any length of time, as it is liable to be decomposed, and to form a brown, inodorous, insipid substance, whose characters have much resemblance to those of ulmine. Boiling alcohol acts in an analogous manner; when cold it does not dissolve more of it than boiling water.

I procured several combinations of cetrarine with different acids. They are uncrystallizable, more or less soluble in water, and possess somewhat of the bitter taste of the base, but in a very diminished degree. The acetates of lead, when added to solutions of cetrarine, produce gray flocculi; the salts of the oxide of mercury cause white, mucilaginous precipitates; the chloride of tin, as well as the salts of iron induce no change. Concentrated sulphuric acid renders the cetrarine brown and carbonises it; by nitric acid it is transformed into a resinous yellow mass. I was not able to ascertain, from the small quantity on which I operated, whether oxalic acid was at the same time formed. Finally, cetrarine has such feeble powers, that it forms one of the last of the series of this kind of bodies, and should be arranged near the amphoteric organic principles.

Cetrarine is poisonous, and should only be prescribed in very small doses; less than six grains of this substance caused me considerable headach. The chemical nature of cetrarine fully explains the difference in the efficacy and taste of preparations of Iceland moss as prepared by different druggists.—*Journal de Pharmacie, April 1831.*

ARTICLE XXXVI.—*Physiological and Chemical Observations on the Berries of the Juniper.* By A. C. Nicolet.

The Juniper belongs to the dicotyledinous plants of the natural family of the *Conifera*, J. and *Diacia monodelphia*, L.; it has female flowers, composed of three concave, closely united scales, at the base of each of which is an ovary; after fecundation, these scales unite, enlarge and form a globular and somewhat fleshy berry, containing one or more hard seeds.

M. Recluz has shown that the triangular seeds of the *I. communis* are furrowed, and that these depressions contain fusiform *utriculi* filled with a volatile oil. This structure is not peculiar to the *I. communis*, I have also remarked it in the *I. virginiana*, *I. sabina* and *I. chinensis*.

The berries of the *I. communis* are globular, and contain three seeds, sometimes more; these seeds are triangular, marked with furrows, in which are *utriculi* filled with volatile oil. These bladders are ovoid at the base of the seeds, and fusiform in the lateral depressions.

The berries of the *I. virginiana* are small, of a deep blue colour, ovoid when they contain but a single seed, bilobate and sometimes triangular when they contain two; in the latter case, one is very small and flattened. The seed is ovoid, marked with grooves containing small *utriculi*, which are round at the base and fusiform at the sides.

The berries of the *I. chinensis* are round, bilobate or triangular, having an ovoid seed where they are round, and two triangular ones where they are of the latter form; these seeds are also furrowed and furnished with elongated *utriculi*.

The berries of the *I. sabina* are ovoid, of a deep blue colour, and contain a small oval seed, with grooves and very elongated *utriculi*.

Chemical examination of the berries of the I. communis.
The berries of the *I. communis* are alone used; a volatile oil is obtained from them; in some mountainous countries, more especially in the north, a fermented liquor is made from them

which is termed gin. In other countries, as Germany, and particularly in Switzerland, Juniper berries are employed to aromatise certain articles of food, which are preserved by aid of the fermenting process; in the latter country a tincture is also made which is used in making a *liqueur*.

Wishing to separate the saccharine and resinous matters, I infused bruised Juniper berries in a sufficient quantity of water; after a long maceration they were expressed, the fluid filtered and evaporated to the consistence of an extract; this extract was dissolved, treated with sub-acetate of lead, the precipitate separated by filtration, and the metal thrown down by sulphuretted hydrogen; the clear liquor when evaporated furnished a syrup analogous to molasses, which was endowed with the properties of saccharine matter.

The berries, when distilled with water, furnished a small quantity of volatile oil; after the operation they were separated from the remaining fluid and expressed.

I have remarked that the utriculi which were not broken during the bruising of the berries, remained unaltered after the distillation.

The liquid was very turbid; it was of a greenish colour, but the matter which thickened it was separated by filtering. This matter was soluble in boiling alcohol; by cooling it, a substance was precipitated analogous to vegetable wax, and the filtrated alcohol, when evaporated, left turpentine as a residuum. Thus the resin is only removed, and should not be found in the extract of Juniper made by decoction.

The residuum from the evaporated water was an extract of a disagreeable taste.

The berries of the Juniper, thus exhausted by water and dried, were several times treated by boiling alcohol; the filtrated alcohol was strongly coloured with green; when cooled, it deposited abundant flakes of a matter resembling wax; this matter was separated from the liquid by filtering.

The alcohol, after having been distilled, furnished a green turpentine, which being mixed with a small quantity of alcohol, precipitated, at the end of a few days, a substance of a crystalline appearance. Sometimes the deposit is not

made, but then the liquid becomes covered with a crystalline pellicle. This matter, expressed through paper to separate the turpentine from it, then dissolved in alcohol and filtered through animal charcoal, crystallized during the spontaneous evaporation of the liquid. At the first operation it is highly coloured with green, but by repeating it a great number of times it may finally be obtained in brilliant flakes of pearly appearance, which group around several points, forming rosettes whose flakes appear to assume a rhomboidal form.

When the alcohol which contains the dissolved crystalline matter is evaporated by a gentle heat, a mass is obtained, which, when cooled, presents crystalline rays diverging from different points.

This matter resembles in some degree the resins; it is fusible, is soluble in ether, alcohol or the volatile oils; it is insoluble in water, and chlorine changes it. In its greatest purity the flakes are very brittle and easily pulverized.

The matter, which is precipitated during the cooling of the alcohol, is analogous to vegetable wax; it is greenish, and may be bleached by chlorine; it is soluble in ether, as also in alcohol and the volatile oils when heated, but it separates itself from them when cold; in this state it is pulverulent. That which is precipitated from the essences, when seen through a microscope, presents a species of crystallization. This matter is easily melted, and diffuses an aromatic odour.

I am indebted to M. Henry, Jun. for the following analysis.

A crystalline resinous matter, volatile under the form of a white smoke, with an aromatic odour, pungent and somewhat analogous to the volatile oil of bitter almonds.

One hundred parts furnished:

Carbon	75.04
Hydrogen	5.1037
Oxygen	19.8563
Azote	?

Matter analogous to vegetable wax, white, in small, mica-ceous flakes, easily melted, and imparting an aromatic odour resembling that of wax.

One hundred parts of this matter afforded :

Carbon	65.400
Hydrogen	7.3227
Oxygen	27.2773

100

Thus the berries of the Juniper, besides the essential oil and the saccharine matter, contain a vegetable wax, which has a tendency to crystallize in pure volatile oils, and also a resin, which is remarkable for the facility with which it crystallizes when it is freed from the turpentine, from which it is extracted.

I intend continuing this analysis in order to complete the history of Juniper berries.—*Journal de Pharmacie*, June 1831.

ARTICLE XXXVII.—*Memoir on the preparation and medical uses of the Proto-tartrate of Mercury and Potash.*
By MM. F. Carbonell, M.D. and Bravo, Pharmaceutist.

The super-tartrate of potash dissolves, by aid of heat, the protoxide of mercury, and gives rise to two very different salts, viz. the tartrate of mercury, and the proto-tartrate of mercury and potash. The first, composed of tartaric acid and the protoxide of mercury, is almost wholly insoluble in cold water, and almost so in hot. The second is very soluble in all proportions of this fluid, both hot and cold; in fact, it dissolves in an equal weight of water at 20° R.; it is even deliquescent; cannot be obtained in crystals; is in the form of a dry mass, looking like ice.

During the action of the super-tartrate of potash on the protoxide of mercury in water, the tartaric acid combines in two ways with this oxide; the excess of the acid forms a simple salt, or the *tartrate of mercury*, which is almost wholly precipitated on cooling, whilst, in evaporating the liquid, the double salt or the *proto-tartrate of mercury and potash* is obtained.

The state of oxidation of the mercury has no influence on the results, the tartaric acid only combining with the protoxide of the metal. If this is in the state of a protoxide, a direct combination takes place; if, on the contrary, it is in the state of a deutoxide, a portion of its oxygen acts on the carbon of the tartaric acid which is decomposed; and a great quantity of carbonic acid gas is disengaged, which can be collected under proper receivers.

The proto-tartrate of mercury may also be prepared by double decomposition, that is, by pouring a solution of the neutral tartrate of potash into a solution of the nitrate or sulphate of mercury, as has been recommended by several chemists; but the double salt can only be obtained by the direct action of the super-tartrate of potash on the protoxide or deutoxide of mercury in water, and by the aid of heat.

After this action the liquid is to be filtered by means of unsized paper placed on clean linen, that it may pass rapidly; it deposits at the bottom of the vessel a crystallized saline crust, principally composed of the super-tartrate of potash, and a certain quantity of the proto-tartrate of mercury; the liquid is now to be decanted and evaporated, when the tartrate of mercury and potash precipitates. During the evaporation the filtered liquor successively precipitates the proto-tartrate in the form of a white crystalline powder, which must be separated as fast as it is formed.

The proto-tartrate of mercury and potash is somewhat of an ash colour; its taste is cool, pungent, and metallic; it is slightly alkaline, as it restores the colour of litmus paper changed by an acid. The acetic, nitric and hydrochloric acids decompose it, and the cream of tartar is precipitated;

it is not decomposed in the humid way, even when it is treated with a solution of potash, soda, ammonia, the hydro-sulphates of these salts, or by the hydro-sulphuric acid. To analyse it, recourse must therefore be had to the dry way*.

An attentive perusal of the different formulas given for the preparation of the tartrate of mercury, will show that this salt has almost always been made by mixing a solution of the tartrate of potash with one of the nitrate, sulphate, or deuto-chloride of mercury. But all these formulas give only an almost insoluble simple tartrate of mercury, and never the double salt under consideration. It is true, that in a few pharmacopœias it is recommended to use the cream of tartar and the oxide of mercury; but directions are only given to collect the quantity of proto-tartrate of mercury, which first crystallizes and precipitates on account of its little solubility; this is then to be washed in pure water, but no caution is given to preserve the water which has taken up the soluble portion or the proto-tartrate of mercury and potash.

We will indicate the precautions to be observed to obtain this double salt.

1. An exact mixture is to be made by long trituration of one part of the protoxide or precipitated deutoxide of mercury, from the nitrate of the same, and two parts of finely pulverized cream of tartar; this mixture then to be gradually thrown into an earthen pot capable of holding from twelve to sixteen pounds of boiling water to each pound of the mixture. The liquid must be filtered whilst boiling through blotting paper placed on thin muslin.

2. The filtered liquid is to be evaporated to dryness, taking care to separate all the mercurial tartrate which is

* The atomic composition of the proto-tartrate of potash and mercury, according to the doctrine of Thomson, is

Tartaric acid, 2 atoms	16.5
Protoxide of mercury, 1 atom	26.0
Protoxide of potassium, 1 atom	6.0
	<hr/>
	48.5

precipitated in the form of crystals or pellicles; this may be done with a wooden or ivory spoon as fast as they form, and the liquid is to be filtered as often as necessary, viz, as often as it deposits this simple tartrate.

3. The evaporation to dryness of the proto-tartrate of mercury and potass should be effected in glass, or glazed earthen vessels, by a sand bath or small fire, or, what is still better, in a water bath; the heat must be more especially managed towards the close of the operation not to decompose this double salt; when the matter is reduced to an appearance of ice, it is to be further dried by the heat of the same evaporating vessel removed from the fire.

4. Finally, this salt must be kept in glass vessels with ground stoppers, and coated with some opaque substance to prevent the action of air and light upon it, as this, like all the mercurial compounds, is injured by these agents. Metallic vessels are not to be employed either in the preparation or preservation of this salt.

The proto-tartrate of mercury and potash is prescribed in solution, or in pills made with some mucilage, syrup, or extract, as that of bark, and to this may be added other articles, as the extracts of hyocyamus, or aconite, when it is employed in cases of venereal pains complicated with rheumatism.

I am convinced from long experience, that this salt is endowed with energetic properties, and that it may be employed with the greatest success in inveterate venereal disorders. The dose in which I administer it is from two to twelve grains in adults; there need be no fear in augmenting these doses, as it is not caustic, if it has been well prepared and deprived of the tartrate of mercury; it never occasions salivation; at the same time, I will add, that in a majority of cases I have found a dose of six to eight grains, twice a day, quite sufficient.—*Journal de Chimie Med.* March, 1831.

REVIEW.

ARTICLE XXXVIII.—*A Manual of Materia Medica and Pharmacy, comprising a concise description of the articles used in Medicine, &c. &c. From the French of H. M. Edwards, M.D. and P. Vavasseur, M.D. Corrected and adapted to British practice. By John Davies, M.R. C.S. Surgeon in the Hert's militia, late Editor of the London Medical and Surgical Journal, &c. London, Whittaker, Treacher & Co. 1831, pp. 490, 8vo.*

Most of our readers will doubtless be somewhat surprised on reading this title page, as they may have some recollection of the appearance of a work with a similar title about a year and a half since, except, that instead of by John Davies, &c. is to be found "translated from the French, with numerous additions and corrections, and adapted to the practice of medicine and the art of pharmacy in the United States, by Joseph Togno, M.D. &c. and E. Durand, member of the Philadelphia College of Pharmacy." But their astonishment will be increased when they are told that this Dr John Davies, &c. &c., has absolutely published this American translation as his own, not, we will do him the justice to say, absolutely asserting that it was *bona fide* his translation, but leaving this to be inferred, by never alluding to the real authors of it, or even hinting that it had ever before appeared in an English garb, except in a short note at page 27. This is not the first time that some of our transatlantic brethren, although they decry American science and literature, and

appear to consider all that emanates from our presses as beneath their notice, have shown themselves not a little eager to profit by our labours, whenever it could be done without much danger of detection. Had the American edition of the *Manual of Materia Medica and Pharmacy* been a mere translation of the French work, and thus republished without acknowledgment by Dr Davies, however uncourteous we might have considered such conduct, we should still have passed it over without comment; but when the English editor has adopted by far the greatest proportion of the valuable additions made by MM. Tognó and Durand, without the slightest allusion to the source from whence he derived them, incorporating them with the original matter of the work, it would be doing injustice to ourselves and our friends to permit such an open attempt to appropriate the fruits of their industry and learning, without noticing it in the manner it so richly deserves.

That we may not appear to have descended into an unwarranted harshness of language in our animadversions on Dr Davies's conduct, we will endeavour as briefly as possible to show the grounds for our assertions. In the preface he says, "The editor submits an English edition of MM. Edwards and Vavasseur's *Manual* to the opinion of his medical brethren in this country, with the hope that it may be found to facilitate the study of those branches of the healing art of which it treats. He has been induced to undertake the task of preparing the present edition, after giving a full consideration to the merits of the works on *materia medica* and *pharmacy* published in Britain. Whether his labours are likely to lead to any benefit to the profession he leaves to his brethren and to time to determine." "The editor has made numerous corrections in the present edition, and he has added some new matter to the work." Thus it will be seen that not one word is said of his making use of the American translation, nor can it even be inferred that another edition of it had ever appeared in English, except from the words "the editor has made numerous corrections in the present

edition," and these are as applicable to the French as to the American edition.

Let us examine what these numerous corrections amount to. From a careful comparison of the two works, we find that the English is almost a verbatim copy of the American, except in a few instances, where the English editor has corrected some errors in construction and idiom, which had unavoidably crept into the phraseology of the American translators, both of whom being foreigners, could scarcely be expected to understand those niceties of language, which are only attainable by a native. No material changes have, however, been attempted by Dr Davies; on the contrary, he has implicitly adopted the American text, without attempting to follow the example set by MM. Togno and Durand, in inserting the discoveries which have been made since the publication of the former edition, or by the addition of any new matter of importance.

The alterations he has made, are inserting as parts of the original text, or perhaps what he claims as his new matter, all the accounts of American plants, and the notices and analyses of the principal American and English mineral waters, &c., which in the American edition were marked by brackets to point out what had been added by the American editors. Even the notes added and marked in the American copy "Am. Eds.," in the English edition have "Tr." affixed to them, as if they were original with Dr Davies; perhaps they mean *transferred* by him. He has, however, inserted in the table showing the proportion of pure alcohol contained in one hundred parts of the principal wines, &c., the relative strength of some of the home made wines.*

But notwithstanding the "numerous corrections" on which he prides himself, he has strangely overlooked some material errors made by the American translators, some of

* As far as we have been able to discover, the only really original matter furnished by the English editor, are his preface and four notes at pages 209, 245, 247 and 249, and six paragraphs on mineral waters, at pages 92 and 223, of a few lines each. If he inserted any thing else, it has escaped our observation.

which we will point out. Indeed we should almost be disposed to think that he had never seen the French text, or he would not have failed in detecting these errors. Thus, both English (page 10), and American (page 26), say, "Salts may be neutral although they contain a small excess either of acid or of base," whereas the authors say, "salts may either be neutral or may contain a small excess of acid or of base." Page 34, l. 49: "Carbonisation is an operation similar to calcination, but carried to a greater degree," whereas it should have been, "to a less degree." The English author has also made another of what we suppose he terms his corrections, in making cantharides a fruit instead of an insect, by changing its generic name of *melos* to *melo*. We might multiply examples, but we trust that we have given sufficient to satisfy even the most sceptical. There is one alteration of the American text, however, which requires notice. In the article Wax Myrtle, page 336, Dr Davies has wholly misunderstood his subject, and by way of improvement has transposed the different paragraphs of the American edition in such a manner as totally to destroy their meaning. This article, which is original in the American edition, is included under the head of *Emetic Substances*, because it was first intended to speak only of the bark of the root of the *Myrica cerifera*, which is eminently endowed with emetic properties, and has been successfully used as a substitute for ipecacuanha. As the translators had obtained further information through Dr Fahnestock, respecting the powers of the wax as an anodyne astringent too late to include it under its proper head, it was mentioned when speaking of the plant itself; the English editor, from a wish of amending the arrangement, has made the wax the principal article, and yet has still retained it among the emetics; in making his fancied emendation, he has also committed an extraordinary blunder in saying, "the shrub which yields the myrtle and abounds in many parts of the United States." Besides the superfluity of the word "and" in this sentence,

it makes the shrub bear itself, instead of berries furnishing the wax.

But enough of this unpleasant duty, which we are bound to fulfil in vindication of the claims of two estimable and worthy fellow citizens, and to mark our sense of these wholesale literary plagiarisms. Every man has a right to make knowledge his own, wherever he meets with it, and to give it to the world again in what garb he pleases, provided he gives due credit to the originators and authors of that knowledge.

We are glad to learn that the American editors intend shortly to publish a second edition of their work, in which the errors of the former will be carefully corrected, and great additions of new and interesting matter will be inserted, especially as relates to the recent discoveries of numerous simple bodies, and of new powers appertaining to those previously known, as fluorine, bromine, thorine, &c. They have also much improved the chemical nomenclature of the original authors, thus, using the terms carbonate of lead instead of sub carbonate, baborate of soda for sub borate, &c., &c.

ARTICLE XXXIX.—*The Edinburgh New Dispensatory, &c.*
By Andrew Duncan, M.D. Twelfth edition. Edinburgh,
1830, pp. 1127.

The Edinburgh New Dispensatory, originally published by Dr William Lewis in the year 1754, was the first truly scientific work on pharmacy in the English language. Whoever compares the early editions with Quincy's Dispensatory, the most popular work extant at that time, will perceive its superiority. It is evident that Dr Lewis had studied the subject as fully as the very imperfect chemistry of that age

permitted, and that he wrote out his descriptions after close inspection of the drugs described. His work was not a mere compilation from other books, but a judicious and original composition, to the improvement and perfection of which he devoted himself with great zeal and success. "The manner in which the whole was executed," says Dr Duncan, "placed Dr Lewis at the head of the reformers of chemical pharmacy; for he contributed more than any of his predecessors to improve that science, both by the judicious criticism with which he combated the erroneous opinions then prevalent, and by the actual and important additions he made to that branch of our knowledge." Dr Lewis's Dispensatory became at once popular, and passed through many editions during his life, all of which received improvements from his hand. After his death the publication was continued by the booksellers under the care of Drs Webster, Duncan and Roth-eram in succession. Since the year 1800 it has been superintended by the younger Dr Duncan, under whose name it retains its popularity and superiority, and has passed through twelve editions. The staple of the work is still Dr Lewis's, although the numerous additions and alterations required by the advance and change of science have rendered a great part of it entirely new. Dr Duncan deserves the thanks of the profession for the continued labour bestowed by him upon this work, and especially for the last edition, which is greatly improved upon its predecessors, and which we consider as by far the most accurate and learned Dispensatory in the language. These improvements are due to Dr Duncan's knowledge of the German and French authors, who are our masters in this science, and to whom we are indebted for almost all the discoveries and researches of which the last ten years have been so fruitful. Dr Duncan himself acknowledges as one of the circumstances which rendered a revision of the work necessary, the very valuable notes of Robiquet and Chereau to a French translation of his tenth edition. He has also incorporated into this edition the great improvements in the Dublin Pharmacopœia of 1826, and has

made free use of Dr Barker's commentary and translation of that work, and all the treatises on Pharmacy and Materia Medica which have recently appeared on the continent.

A compilation from these copious sources, performed with the skill and judgment for which Dr Duncan is distinguished, could not fail to prove highly interesting and valuable. Such a one was required by the profession, which had been compelled to resort to the writings of foreigners for the information required to keep them in advance with the improvements of the age. The superficial work of Dr Paris, and the highly valuable and respectable Dispensatory of Anthony Tod Thompson are both deficient in the particulars now spoken of, although the latter is superior to any former edition of Dr Duncan in most respects, and even to the present in the Botanical department.

The principal defect in the work before us appears to us to be in this department. It may be said, it is true, that the proper subject of a Dispensatory is the drugs themselves, and their properties as presented to the apothecary. Yet that knowledge can scarcely be considered as full and complete which does not embrace the character of the plant itself, so as to enable him to recognize it. Pharmacy now takes a wider range than it did in the days of Dr Lewis, and calls in to its aid all the collateral branches of natural history. In the German schools of Pharmacy, which are the models from which the English and Americans must copy, if they ever attain to distinction in this science, the study of all the collateral branches of natural history is insisted upon, and proficiency therein is made a requisite for admission to the privileges of the profession. This defect in Dr Duncan's plan may be exemplified by the article *Melissa officinalis*, which we take almost at random from the book.

Melissa Officinalis. Ed. Dub.

Willd. g. 1118; Spr. g. 2052, sp. 1. *Didynamia Gymnospermia.* Nat. Ord. *Verticillatæ*, Linn. *Labiataë*, Juss. Balm.

Off. the Herb.

FOLIA, Ed. HERB, Dub.

Balm is a perennial herb which grows wild in the Alps and Pyrenees, and is frequently cultivated in our gardens. It has a pleasant smell like citron, and a weak roughish aromatic taste.

Med. use. It is principally used in the form of a watery infusion, which is drunk in the manner of tea.

In this description the student is supposed to be acquainted with the plant, or it is not thought to be worth while to tell him any thing respecting it. What is there in the above account of the plant which does not apply as well to the *Verbena triphylla*?

The article on the same plant from Dr Thompson will exemplify our views of the proper manner of writing a Dispensatory, and will show at once the superiority of his method.

“*Melissa*. Spec. Plant. Trilld. III. 146.

“Cl. 14. Ord. 1. *Didynamia Gymnospermia*. Nat. Ord. *Verticillatæ*, Linn. *Labiata*, Juss.

“G. 1118. Calyx dry, nearly flat above, with the upper lip subfastigiate. Corolla, upper lip somewhat arched, bifid; lower lip with the middle lobe cordate.

“Species 1. *Melissa officinalis*. Officinal or Common Balm. Med. Bot. 2d edit. 335, t. 119.

“Officinal. *Melissa Officinalis*. Folia, Edin. Balm leaves.

“Syn. *Melisse* (F.), *Melisse* (G.), *Melissa* (L.) *Balsamina* (S.).

“Balm is a perennial plant, a native of the south of Europe, growing in mountainous situations, and flowering from July to September. It is cultivated in our gardens. The root is fibrous, and sends up annual stems which rise about two feet high, and are branched, quadrangular and smooth. The leaves are opposite in pairs, of a bright green colour, ribbed, deeply serrated and cordate; the lower ones on long foot-stalks, and the upper nearly sessile. The flowers, which are in small axillary branches forming semi-whorls, stand on slender peduncles, at the base of which are small, oblong, notched, hairy bractes. The calyx is tubular and pentan-

gular; the upper lip tridentate; the lower shorter, and cut into two acute teeth. The corolla, which is tubular, of a yellowish white colour, with the upper lip shorter and notched, and the lower three-cleft, encloses the anthers: the seeds are four, ovate, and placed at the bottom of the calyx. For medicinal use the herb should be cut before it flowers.

“Qualities.—The recent plant has the agreeable odour of lemons, which is lost in drying, and an austere, slightly aromatic taste. In distillation with water, it yields a small portion only of a yellow essential oil, on which its odour depends. The watery infusion tastes rough; reddens slightly litmus paper; and affords with oxysulphate of iron a deep olive; with nitrate of silver a deep brown, and with acetate of lead a copious greenish white precipitate.

“Medical properties and uses.—Balm is stimulant, stomachic, and diuretic. It was formerly prized as a corroborant in nervous affections; but it is now used only in infusion, as a diluent in fevers.”

The mere reference to botanical authorities, which are not easily accessible, is worth but little to the apothecary, compared with the value of a full and clear description in plain language of the plant itself. In reference to the indigenous plants of his country, this full description appears to us to be indispensable, and in regard to the exotic officinals, to be of great value and interest.

If Dr Duncan must yield the palm to the London Dispensatory in this respect, he may claim the merit of having embodied into his present edition the recent researches of the continental writers respecting the origin and qualities of drugs, and much more accurate and copious criticism in the chemical department than is to be found in the work of Dr Thompson. We shall proceed to lay before our readers such passages from the work as will be new and interesting, and convey an idea of the great value of the present edition.

Under the head of Gum Arabic we are told,

“Hayne, in his tenth volume, has described the gum trees more accurately than his predecessors, having derived much information on this subject from Ehrenberg. Gum is produced by various species of *Acacia*, viz. *Gummifera*, *Ehrenbergiana*, *Senegal*, *Seyal*, *Arabica*, *tortilis*, *Karoo* and *vera*. Ehren-

berg saw the Bedouins engaged in gathering the gum in Egypt; that got from *A. Ehrenbergiana*, they called *Samle*; that from *A. Seyal*, was *Sejal*; and that from *A. tortilis*, they call *Aohle*. He also remarked, that different kinds of gum are got from the same species. The juice flows out from the tree sometimes as if frothy, sometimes dense, and clear or dark in colour, and the masses in which it concretes are of different forms and sizes. Hence it happens, that the kinds which occur in commerce are not always got from particular species, but that, wherever gum is collected, it must be sorted to form the different kinds found in commerce.

"Dr Roxburgh has described the *Mimosa Arabica* of Bengal as capable of furnishing employment to the natives in collecting its gum; but it would appear that the greater part of the East Indian gum is obtained from the *Feronia Elephantum*.

"There occurs also occasionally an insoluble gum, resembling Gum Senegal. It is at once known by putting a piece into the mouth. It does not adhere to the teeth, but swells and feels elastic under the teeth.

"In the Parisian Pharmacopœia there are two varieties of Gum Arabic admitted: *Gummi Thurai*, which, by comparison, I find to correspond with our picked, and *Gummi Jaddæ* with our common gum. Their *Gummi Senegalense* resembles our gum of the same name.

"According to Hayne there are four kinds of gum in commerce: 1. *Gum Arabic*, in whitish round masses, full of fissures, very crumbly, which is said to exude as a frothy juice. 2. *Barbary gum*, in small, compact, commonly longish pieces, yellowish, or more or less brown, often almost transparent, and tolerably brittle. 3. *Gum Gedda*, larger, commonly round pieces, of a brownish red, and less brittle. These three kinds all come through the ports on the Mediterranean sea. 4. *Gum Senegal*, in large roundish pieces, of whitish, yellow, or reddish colour, very difficultly broken, and large conchoidal fracture."

"Ammomum Cardamomum.

"The confusion which at present subsists in regard to the shrub producing this spicy seed, it is to be hoped, is now likely to cease, since the publication of Dr Roxburgh's classical *Flora Indica*, in which it is referred to the *Alpinia Cardamomum*, g. 15, sp. 1. He has been already followed by Sprengel and the Berlin Pharmacopœia. The names given by the London and Edinburgh Colleges are synonymes of the true plant; but the *Ammomum Cardamomum* of the Dublin furnishes a spurious, and not the true, cardamom.

"The notes to Roxburgh's botanical description contain some curious information on the subject. The plant is a native of the mountainous part of the coast of Malabar. The root is tuberous, and the stem perennial. The capsules are oval, size of a small nutmeg, three celled, three sided; the seeds many and angular.

"The seeds, it is asserted, never germinate, and the plant is propagated only by cuttings, or in the following manner. Before the commencement of the periodical rains, the cultivators of the cardamom ascend the coldest and most shady side of a woody mountain. A tree of uncommon size and weight is there sought after, the adjacent ground is cleared of weeds, and the tree felled close at the root. In about a month's time young cardamom plants appear. The natives

attribute no other effects to the fallen tree, which may be selected from any species, than such as are derived from its weight and strength, added to the shade which its branches afford to the young plant. The shrub continues to grow in this manner until nearly after the early rain of the fourth year in February, when it has reached its utmost height, which varies from 6 to 9 feet. Four or five tendrils, called the threads, now spring from its stem, near the root, and afterwards the fruit is produced, which is gathered in November, and dried in the sun. The fruit is annually collected until the seventh year, when it is usual to cut the plant down, and from the trunk sprouts arise in 'the next monsoon, which grow, flourish, and are cultivated as before. This article yields to the Indian government from 25 to 30,000 rupees *per annum*."

The article on *amylum* conveys a clear account of the late researches of chemists into its varieties, which, though not altogether new, will, we think, be interesting to our readers.

"Starch is not absolutely identical as obtained from different vegetables. M. Caventou made some interesting observations on amylaceous substances. Wheat starch, their prototype, is totally insoluble in cold water; but from various causes it may be so modified as to become more or less soluble. Saussure described the effect produced in a mixture of starch and water left together to undergo the process of spontaneous decomposition. They formed a paste, which by analysis was found to contain sugar 47.4; gum 28; modified starch 8.9; starch 4, amylaceous lignin 10.3 = 93.6. To the modified starch he gave the name of *Amidine*. But Caventou proved, that fermentation is not necessary to its production; for unfermented starch experiences the same modifications when it is boiled with water, or heated until it becomes of a pale brown colour (British gum), or treated with dilute sulphuric acid. The characters of amidine are, solubility in cold water, being precipitated by tincture of galls and by acetate of lead, and not forming a jelly on cooling after being concentrated. The arrow-root (*Maranta arundinacea*) of the West Indies, and potato starch, in the preparation of which also no heat is employed, agree with raw wheat starch in all respects. But sago (*Sagus farinifera*), and tapioca (*Jatropha manihot*), are not varieties of starch but of amidine. They must, however, have been extracted from the plants in the form of starch, as they are got by washing with cold water; but the modification is afterwards effected by the heat employed in the process of drying or by slight torrefaction. Salep (*Orchis mascula*) is not an amylaceous substance, but analogous to gum tragacanth, containing a large proportion of bassorine.

"M. Villars of Strasborough published a very curious essay on the structure of the potato, as seen by the microscope. He found the starch (farine) of potatoes formed of ovoid globules from 1-100th to 1-50th of a line in diameter. Those of wheat starch were about one-third of the size, varying from 1-250th to 1-100th. Those of potato were smooth, brilliant, and milky, like globules of mercury. When bruised upon a glass, they were reduced into square or irregular fragments, but still smooth. By boiling they were enlarged about a third, but seemed cracked on the surface. When viewed in a thin slice of frozen po-

tato, they were seen disposed in contiguous groups in the meshes of a network of fibre, but not adhering to them. Wheat starch is less easily altered by heat than potato starch; it contains less water, which it parts with and recovers less readily. Therefore potato bread does not keep fresh above two or three days; wheat bread keeps from four to eight; and rye bread at least fifteen or twenty, or even a month, especially if the bran be not separated.

"MM. Raspail and Dumas have since published some very remarkable microscopic observations on the structure and different forms and size of the varieties of *fæcula*.

"M. Planche having observed the remarkable lightness of some starch prepared by him from the root of the black radish, conceived that a comparison of the weight of equal volumes might serve to distinguish the *fæcula* of different vegetables. According to him, the specific gravity of flour starch to potato starch was as 62 to 84; and this difference seemed not unimportant in pharmacy, as the former serves admirably to suspend camphor, for which the latter is unfit. This led MM. Payen and Chevallier to institute some experiments, from which it may be concluded, that the specific gravity of all starches is the same, 1530; and that the difference of the weight of the same volume, when dry, is owing to the particular minuteness of their grains.

"In this country the finest starch is obtained from wheat flour, but it is also procured of very fine quality from the potato. In the West Indies what is called Arrow root, is prepared from the roots of the *Maranta arundinacea*; and a similar substance is got in the East Indies from various species of *Curcuma*. Other kinds of *fæculæ* are more or less altered by the process followed in preparing them. What is commonly sold as arrow root is nothing but potato starch. In fact, it is sold for less than genuine arrow root costs in the West Indies. Nor does any harm arise from the substitution; for, so far as my experiments go, I can find no chemical difference between them, although many modes of distinguishing the genuine from the spurious are from time to time published in periodical works."

The description of the solid camphor of Borneo will be new to the English reader.

"The most minute description of the solid camphor of Borneo is given by Dörrfurt and Schwartze, taken from John Crawford of Demerary,—an authority I have not been able to trace. It is said to be stronger than laurel camphor, and more fixed; to be opaque, of a chalk-white colour, friable between the fingers, of a not unpleasant taste, first cooling and then heating, and emitting, when refined, a distinct violet smell; and that a small portion is soluble in water, and the rest consists of pure volatile oil. The specimen examined by me does not altogether coincide with this description. It occurs in tabular plates somewhat translucent. It is easily pulverizable without the addition of alcohol, and the powder does not agglutinate on standing, whereas that of laurel camphor does. It is evidently more compact than common camphor, emitting a ringing sound when the bottle containing it is shaken. Its specific gravity is hardly less than that of water; some portions even sink. It does not at all sublime spontaneously, nor does it form crystals in the upper part of the bottle in which it is kept. When boiled with water its smell is disseminated, and it

wastes. Its other characters do not differ from those of common camphor. From the same tree is also obtained, in considerable quantity, a limpid fluid. The fluid camphor is transparent, of a pale yellowish colour, smelling like a solution of camphor in oil of turpentine, and of a bitter turpentine taste. To the touch it is slightly viscid, and has not the harshness of oil of turpentine. Its specific gravity at 60° is 887. Exposed to the air on a watch-glass, it was reduced, after standing a month, to one-tenth of its original weight, became a clammy transparent homogeneous fluid, of a very pale brown colour, and resembling in smell as well as consistence Canada balsam, but without any odour of camphor. This residuum seemed to be soluble in ether, and partially in cold alcohol, but on the application of heat it was totally dissolved. Fluid camphor, when agitated with water, formed a whey-coloured mixture, which gradually separated into a transparent supernatant portion, and a milky inferior fluid, but not nearly so quickly as oil of turpentine and water separate. Its distillation with water is liable to the same difficulty as the distillation of oil of turpentine, from the explosions, which blow over into the neck of the retort a part of the mixture; but in the receiver I got a watery fluid, with some oil, and a white opaque pellicle like camphor. The liquor in the retort gradually acquired a gelatinous appearance, and, on standing, was found to consist of a watery fluid, and abundant white curdy-like substance, which floated in the fluid. For specimens of both solid and fluid camphor of Borneo, I am indebted to John Crawford, Esq. resident at Singapore."

Under the head of *Papaver* it is remarked:

"The best accounts of the production of the East India opium are by Mr Kerr and Mr Howison. The very great inferiority of the Indian to the Persian opium is gradually diminishing. By some European gentlemen in Bengal, opium is now prepared in every respect equal to the best of Persia. On this point I can speak with certainty, having received two considerable samples from Dr Adam of Calcutta, and made frequent comparative trials of its power in hospital practice. Its tincture is darker coloured than that of Turkey opium.

"Notwithstanding the successful trials of procuring British opium, especially by Mr Young, I am perfectly satisfied that any attempt to obtain opium in quantity will end in disappointment. The want of heat and the high price of labour on the one hand, and stormy winds and violent rains on the other, are insuperable objections to the culture of the poppy in Britain as a branch of agriculture."

"*Pterocarpus Draco*.

"This is also a very large tree. It is a native of South America. Hayne says, that although the resin of the *Pt. draco* was formerly sent in abundance from Carthage to Spain, it no longer occurs in commerce, on account of the decreased demand for dragon's blood, and that the dragon's blood of commerce comes chiefly from the *Calamus draco* of the East Indies, and also from *C. verus* and *C. rudentum*. It is obtained from their fruit, which, when fully ripe, is covered with a crust of a red resinous substance. This is separated by stamping them gently in a mill, or shaking them in a sac, and is then formed by the assistance of heat into balls about the size of a nutmeg; or it may be got by steaming and boiling the fruit in water. The balls are put up in the cases woven

of the leaves of the *Licuala spinosa*, and the most esteemed are the *S. D. in guttis*. It also occurs in cylindrical rolls, put up in the same manner. A second sort is in larger or smaller fragments, and is called *S. D. in granis*, and is often finer and better than the preceding. A third sort, *in placentis*, in cakes of several ounces weight, is got by boiling the bruised fruit after the former kinds have been separated; and a fourth, *in tabulis*, is a sophisticated mixture of colophony, powdered red saunders, with a little true dragon's blood.

"This drug, in substance, has no sensible smell or taste; when dissolved, it discovers some degree of warmth and pungency. It is fusible and inflammable, and almost totally soluble in alcohol, tinged a large quantity of the menstruum of a deep red colour. It is likewise soluble in expressed oils, and gives them a red hue, less beautiful than that communicated by Anchusa. It is not acted upon by water, but precipitated by it from its alcoholic solution. I found that it is soluble in nitrous acid and alkalies, and that it neither precipitates gelatine, nor affects the colour of the salts of iron. It therefore appears to be a pure resin, without any astringency. The same conclusion has since been made by Melandri, by whom dragon's blood has been lately analyzed, and found to consist chiefly of a new alkaloid, which he has named *Draconine*. He prepares it by decomposing the tincture by water acidulated with sulphuric acid, and washing well with water the precipitate, which is sulphate of draconine. This is a red uncrystallizable mass, very sparingly soluble in water, more soluble in alcohol, and easily decomposed by alkalies. It melts in a gentle heat, and when decomposed seems to contain no nitrogen. *Sanguis draconis in placentis* consisted almost entirely of draconine, but that *in guttis* or *lachrymis* contained little."

"*Ricinus Communis*."

"This beautiful plant grows in both Indies, Africa, Greece, the Levant, and the south of Europe. In tropical climates it survives several years. Richard saw, near Nice, a small wood consisting entirely of arborescent Palma Christi, but in Europe it is in general annual. There is but one species of this plant. Dr F. Hamilton found, however, four varieties very commonly cultivated in India. Two of them (*R. communis* and *R. lividus*, Willd.), are almost always cultivated for seed, and they are, therefore, sown close, so as to stint their growth, and thus bring them early to flower; and when they have ripened their seed, they are destroyed by the plough, a new sowing being more productive than if they were allowed to grow for several years. The other two varieties (*R. viridis* and *R. Africanus*, Willd.) are chiefly cultivated for their leaves, on which a large kind of silk-worm is reared for spinning a coarse silk. On this account they are usually planted in hedges round the huts of those who rear the worms, and, being allowed to stand for years, acquire a considerable size."

"Castor oil is sometimes extremely acrid. It has been a question of great interest among the French and German pharmacists to determine the cause of this occasional acrimony of castor oil, some ascribing it to the embryo, others to the shell or husk, and others to the employment of heat in its preparation. The first is the ancient opinion, and is maintained of other seeds of the same natural family. Thus Jussieu mentions it of the seeds of the *Hura crepitans*; and I have been told that its embryo swallowed alone purges drastically, while the seeds from which the embryo has been removed may be eaten as freely as al-

monds. Bourtron-Charlard and Henry found that the *episperm* of the castor oil seeds possessed no acrimony, that the *embryo* alone yielded a mild oil, with an agreeable taste resembling green coffee, while the oil obtained from the *perisperm* or *albumen* alone becomes acid, if too much heat be used in extracting it.

"M. Guibourt has examined the point with great attention, and has come to the following conclusions. The shell of the castor oil nut does not contain any acid principle, and can only render the oil coloured without imparting to it any bad quality. The taste of the embryo is only a little more acid than that of the perisperm, and it cannot be said that it is the only or principal seat of its acrimony. The perisperm contains both the oily and the acid principle. This acid principle is volatile; water in the state of ebullition expels it from the oil, and by boiling it is possible to obtain an oil perfectly bland and little coloured. Too great a degree of heat, or heat too long continued, alters the nature of the oily principle itself, which acquires thereby a more or less deep colour, and an acrimony which should be considered to render it unfit for use."

We have not space to enlarge much upon the chemical department.

The following observations on the preparation of *Liquor Potassæ Causticæ* are valuable.

"On this process several remarks occur. The proportion of lime to the alkaline salt prescribed by the College is very different. With six parts of the salt the Edinburgh use eight, the Dublin six, and the London only three. According to the atomic scale of equivalents, 28 parts of lime are sufficient to decompose 70 of potashes; but Dr Barker found, by experiment, that a less proportion of lime than five-sixths of the weight of the alkaline salt was insufficient for the purpose. The most obvious inconvenience arising from using an excess of lime is the bulk of the residuum, which requires the employment of larger vessels than otherwise would be necessary; and the spongy nature of the residuum, which retains a considerable portion of the solution. This inconvenience is, however, in a great measure, obviated by pouring on an additional quantity of water, as directed by the Edinburgh College.

"The Colleges also differ in the proportion of water they employ. With twelve parts of alkaline salt the Edinburgh College uses 56 of water, the Dublin 90, and the London 120. At first consideration, this difference might only seem to affect the strength of the alkaline solution obtained; but it appears, from the experiments of Dr Barker, that with a less proportion of water than that ordered by the Dublin College, the alkali cannot be totally deprived of its carbonic acid.

"From the sparing solubility of lime in water, and the total insolubility of its carbonate, its full operation does not take place immediately, or without assistance. On this account the Dublin College direct the mixture to be frequently agitated, during three days, in a well stopped bottle.

"The Colleges differ also in the manner of separating the solution from the residuum. The Dublin College decant off the ley; the other Colleges filter it.

"From the weight and density of the carbonate of lime, it is easy to pour off the greater part of the caustic ley; and as it is in this way exposed, for a very

short time, to the action of the air, it does not absorb from it any notable quantity of carbonic acid, and is therefore very caustic. The only objection is the waste of the portion retained among the particles of the residuum; but this may be procured by filtration. The London and Edinburgh Colleges prescribe filtration. The objection to this method is, that, as commonly performed, it brings the caustic solution too much in contact with the atmosphere. Mr Donovan invented a method by which this was, in a great measure, prevented; but as his apparatus seemed to me to be difficult of execution, and liable to be broke, I attempted a modification of it which I find to answer perfectly. It consists of a funnel, through the throat of which a tube is passed, fitting it only loosely. Around the tube a bit of linen or cotton rag is wound, so as to make it fit the throat of the funnel; and over this a small quantity of very fine and well-washed sand is put, and then coarser sand to keep it steady. The tube is adjusted so as to rise up almost to the level of the upper surface of the funnel. The throat of the funnel fits closely a phial to receive the filtered liquor, and the surface is covered by a glass plate. By this arrangement, while the fluid drops into the phial below, the air it displaces rises through the tube into the upper part of the funnel, and thus the fluid comes in contact with that small quantity of air only which the phial originally contained.

"If the solution of potass be pure, it will be clear, without colour or smell, feel soapy, and will neither effervesce with acids, nor form a precipitate with subcarbonate of potass. If it effervesces, carbonic acid is present, and must be separated by again shaking the solution with a little lime, or by dropping it into lime water, as long as it produces any precipitate. But Mr Phillips has remarked, that even when a small quantity of carbonic acid is contained in it, no precipitate is produced, unless a considerable quantity of lime-water be added; and in his late translation of the London Pharmacopœia, he says, it is in vain to expect to preserve it so perfect, that lime-water shall occasion no precipitation. If, on the contrary, it contain lime, from too much of it having been employed in the preparation, it may be separated by dropping into the ley a solution of the subcarbonate of potass. When we have thus purified our solution of potass, it must be again filtered, to have it perfectly pure. It is necessary to keep the solution of caustic potass in phials of green glass; for it acts chemically upon those of white glass, and very soon destroys them. The phials should also be of small size, so that they may not be frequently opened."

(To be continued.)

MISCELLANY.

Plant affording the Gum Ammoniac.—The products of the umbelliferous plants are not yet properly referred to the species from which they are derived, in a vast number of cases; thus it is doubtful whether the galbanum is produced by the *Bubon galbanum*, as is generally supposed. The origin of the true sagapenum is unknown, although botanists have thought that it was furnished by the *Ferula Persica*, Willd. But it appears that this plant rather affords a kind of assafetida.

The plant of the gum ammoniac has hitherto remained unknown, although seeds have been obtained which produced a species of *Heracleum*, not however affording the true gum. Jackson, in his Essay on Morocco, observed that the *fushook* of that country was a *Ferula* exuding gum ammoniac, but it is in fact the *F. orientalis* of Tournefort and Sprengel, and does not afford it.

Finally, colonel Wright has recently stated that the true plant furnishing this gum resin abounds in Persia and other districts, and that the gum is obtained by incisions. It is an umbelliferous plant, belonging to the family of the *Poucedaneæ*, but constituting a new genus, near *Ferula*. David Don, who has carefully examined it, has called it *Dorema ammoniacum*, and his description of it will appear in the next volume of the Trans. Lin. Soc. of London.—*Virey, Journ. de Pharm., April 1831.*

Dragon's Blood.—M. E. Herberger of Munich has ascertained that this substance is composed of

Fatty matter	2.00
Oxalate of lime	1.60
Phosphate	3.70
Benzoic acid	3.00
Draconine	90.70

100

It is well known, he adds, that M. Melandri has announced the presence of an alkaloid in this resin which he terms draconine. I am, however, convinced of the non-existence of this basal principle; I procured it in a state of purity, and found that it possessed sub-acid properties, which has induced me to class it with the sub-acids, with tannin, &c.—*Ibid.*

Purple Powder of Cassius.—Fisher prefers the proto-nitrate of tin in preparing this article, to any of the other salts of that metal, and more especially to the hydro-

chlorate. In fact the proto-nitrate gives a beautiful purple precipitate, whatever may be the concentration of the solution of gold. The hydrochlorate only produces this result when the solution is diluted to a certain degree.—*Ibid.* from Schweigg-seidel's Journ.

Observations on Salicine, and on its conversion into a colouring principle of a peculiar nature. By M. Henry Braconnot.—I have already stated that concentrated sulphuric acid, when placed in contact with salicine, immediately decomposes it; affording a reddish purple fluid. Yet it is by this very mode that M. Peschier still pretends to obtain sulphate of salicine. I must avow that it is impossible for me to agree with this gentleman in any respect. He says for example, that concentrated sulphuric acid gives the salicine a vivid red colour the moment it comes in contact with it, which colour changes to wine or even to dull red, if the acid be in too great quantity.

I filled a small ground stopper vial with concentrated sulphuric acid, to which I added a small quantity of salicine: on shaking the bottle, the colour was at first feeble, but as the salicine dissolved became of a very bright red, which was not changed by time.

By exposing the solution to the action of the air in a flat vessel, the sulphuric acid, in attracting moisture, gradually deposited the red colouring matter, whilst it will remain in solution on the addition of much water, or even when the acid is saturated with an alkali; but if, on the contrary, the acid be only weakened with its own weight of water, and then saturated with carbonate of potass in powder, a precipitate of sulphate of potass, united to the colouring matter, is formed, of a red approaching rust colour. Boiling alcohol appeared to have little action on this saline deposit, but in afterwards treating it with a sufficient quantity of warm water to dissolve the sulphate of potass, the colouring matter remained in such a state of division in the fluid that it appeared in solution, yet it was readily separated by filtration. When well washed it appeared of a liver red, approaching rust colour.

It was tasteless. Neither water nor alcohol had any appreciable action on it. When a mineral acid was added to it, its dull colour immediately changed to a bright red, it became more coherent and rapidly precipitated. It was insoluble in boiling concentrated acetic acid, which scarcely altered its colour. When treated with boiling nitric acid, it was dissolved and produced carbazotic acid.

The most feeble alkalis communicated a beautiful deep violet colour to this substance; but it was wholly insoluble in boiling caustic potass, and its violet colour remained unaltered; on the addition of an acid it resumed the bright red tint.

When dried, it was in fragile masses of a black colour verging on brown. In this state concentrated sulphuric acid gave it a bright red tint, but did not dissolve it. When exposed to heat, it exhaled a slight empyreumatic odour, and left a large mass of charcoal. This colouring matter having appeared to me to present sufficiently striking characters to merit a name, I propose to call it *Rutiline*.—*Journ. de Pharm.*

Acetification of Alcohol.—At a sitting of the French Academy of Sciences, held December 13th, 1830, M. Serullas announced to the meeting that he had just discovered that when bromic acid is poured on alcohol, vapours of bromine are seen immediately to be evolved, and at the same moment a strong smell of acetic acid is manifested. The chloric and iodic acids act exactly in the same manner upon that liquid, with disengagement of chlorine or iodine, and generation of acetic acid. The acid thus produced is nearly equal in strength to radical vinegar. Mr S. intends to repeat his experiments upon this new process of acetification of alcohol,

which he thinks will throw a great light upon the nature of alcoholic liquors, and may, in its application to the arts, have very curious and interesting results.—*E. D.*

A new reagent for separating Soda from Potassa.—In chemical analyses, great difficulties are frequently encountered in separating soda from potassa. The hydrochlorate of platinum and tartaric acid are the reagents most generally employed for effecting this separation; but the process is slow and incomplete. Whilst prosecuting his researches upon perchloric acid, M. Serullas discovered that when this acid is added to a liquid containing in solution both potassa and soda, a precipitate of chlorate of potassa is instantly thrown down, whilst the chlorate of soda remains in solution. The salt of potassa is insoluble, and that of soda on the contrary is very soluble, even in alcohol. Thus the perchloric acid may be used not only for separating both alkalies from each other, but also for taking up from other acids the potassa they might retain in combination. *April 25th, 1831.—E. D.*

Bleaching of Shell lac and yellow Wax.—Kastner recommends the following process: Mix together three parts of carbonate of potassa, three parts of pulverized lime, and twenty-four parts of water; macerate for twenty-four hours in a close vessel and decant the clear liquor; add to this four parts of shell lac, and carry the liquor to the boiling temperature. When cooled, filter the red mass and dilute it in a quantity of water equal to four times its bulk, then add, gradually, some chloride of lime, until the whole is entirely discoloured. By the addition of diluted muriatic acid, the alkali is neutralized and the bleached lac precipitated; a small quantity of alcohol, with the assistance of a moderate heat, will remove the portions of chlorine that might have remained attached to it. In this condition the lac may be dissolved in alcohol, and will form a white varnish.

Yellow wax may be bleached by the same process.—*Arch. für die ges. Natur. E. D.*

Number of Druggists in Prussia in proportion to the population. In an interesting memoir by M. Julia Fontenelle he gives the following table.

Provinces.	Inhabitants.	Druggists.	
		1st class.	2d class.
Prussia	1,900,540	22	60
Western Prussia	772,577	25	42
Brandenberg, except Berlin	1,293,480	50	107
Pomerania	870,055	25	62
Berlin	223,520	29	
Silesia	2,365,949	71	86
Posen	1,051,137	26	52
Saxony	1,396,240	43	108
Westphalia	1,210,712	15	107
Rhenish provinces	2,168,053	56	175
	12,552,268	367	799

Journ. de Chimie Med.

On the application of the Sulphuret of Cadmium to dyeing.—From a paper by M. Laissaigne on this subject we extract the following:

This body, which was discovered by M. Stromeyer, may be fixed on silk, by impregnating this substance in the first instance with the chloride of cadmium, and afterwards placing it in a weak solution of hydro-sulphate of potass or soda. It is

easy to do this by keeping the silk plunged in a solution of the chloride of cadmium at a temperature of $+50^{\circ}$ to 60° for fifteen or twenty minutes, afterwards wringing it and putting it in a weak solution of the hydro-sulphate of potash at the ordinary temperature. As soon as it is immersed in this liquid, it assumes a golden yellow colour, from the production of the sulphuret of cadmium, which becomes intimately united to the substance of the silk. Different shades of colour may be produced by using different quantities of the sulphuret. The colours thus obtained are unalterable by the strongest light, by diluted acids or alkaline solutions.—*Journ. de Chim. Med.*

Red dye from Peru.—M. Virey states that certain seeds of a deep red colour have been brought from Quileá in Peru, which give a beautiful carmine coloured infusion. These seeds are acidulous, pyriform, angular, uncinatè or a little curved. He is of opinion that they are derived from a species of *Mulpighia*, probably the *M. tuberculata* of Jacquin. This shrub is a native of both the Caraccas and Peru; it is known in the latter country under the name of *moureila*. The carmine colour afforded by these seeds is not very permanent, but is exceedingly rich and brilliant at first.—*Journ. de Pharm.*

Jalap.—M. Desfontaines read a notice before the institute of France on two new species of Jalap.

These two jalaps, or rather the leaves and flowers of the vegetables which furnish them, were sent to M. Desfontaines by M. de Humboldt, in a box which had been transmitted from Oribaza by M. Ledanois, a druggist established in that city. The latter does not give any description of those jalaps; he merely states that they grow in the vicinity of Oribaza, in a temperate climate, and that they are capable of withstanding several degrees of frost. He also sent some seeds, which have been sown in the *Jardin du Roi*. One of these plants, known in the country under the name of *male jalap*, is, according to M. Ledanois, a very good purgative, and has not the acidity of the common jalap, and that he has always administered it with success. He also states that he had sent roots to M. Chevalier, for them to be analysed. M. Desfontaines has examined these two species of jalap; they belong to the genus *Convolvulus*: their leaves are heart-shaped, those of the male jalap are tomentose, those of the other smooth and terminated by a long point; their corolla is of the form and size of that of the *C. sepium*, and of a beautiful rose colour. The specimens sent are too imperfect to ascertain if these two plants have been described or known; but, he adds, that there is no doubt that they are different from the species cultivated in the *Jardin du Roi* (*C. jalapa*, Desfon.). This has a white corolla, a wrinkled leaf, and covered beneath with thick set down, characters which evidently distinguish it from the other species.—*Journ. Chim. Med. Feb. 1831.*

Action of the Salts of the Protoxide of Mercury on the solution of Gold.—From the experiments of professor Fischer of Breslaw, the salts of the protoxide of mercury form with the solution of gold, a compound analogous to the purple precipitate, produced by the mixture of this same solution with the proto-hydrochlorate of tin. When the proto-nitrate of mercury is added to a solution of gold, a grey-blue precipitate is obtained, the colour of which is more or less deep, according to the proportion of the salts. This precipitate is composed of the deutoxide of mercury and the sub-oxide of gold. The combination is as intimate as in the purple powder of Cassius; hydrochloric acid does not decompose it. This acid only dissolves a small portion of the mercury, and then the colour passes to a clear grayish white.—*Journ. de Pharm. March 1831.*

Action of Iodine on some Essential Oils.—M. Haaschoff of Eszen (Brande's Archiv.) states that the addition of a little iodine to a few drops of oil of juniper, produces a great elevation of temperature, with a disengagement of yellowish violet vapours. The residuum on cooling was fluid, of a yellow, brown colour, and had the smell of the essential oil; its peculiar taste was also perceptible after it had stood for some time. When iodine was added to oil of savin a violet reaction took place, with great heat, and the disengagement of violet and yellow fumes; the residue was a resinous mass of a dark brown colour, with an empyreumatic smell. Oil of peppermint slowly dissolved the iodine, without any elevation of temperature. Its odour and taste remained unaltered. There was no reaction with the oil of rue, it merely became somewhat thicker, and assumed a brownish red colour. The oils of tansy, mint, parsley and caraway, likewise underwent no change, except that the former became of a beautiful brown red colour. When a small quantity of spirits of turpentine was added to those oils which were not altered by the iodine, a violent reaction took place, with disengagement of heat and copious fumes of a yellowish violet colour. Hence iodine is a good test of the purity of the above mentioned oils, which are often adulterated with spirits of turpentine.—*Journ. de Pharm.*

Remedy of the Hindoos for Cholera Morbus.—It is said that the *Bean of St Ignatius* (*Ignatia amara, L.*) is successfully employed in India against the Cholera Morbus. It is called *Calamba pepita* in the Philippine islands where it grows. An alcoholic tincture is made of it which is given in drops in some convenient vehicle, and sometimes with opium.—*Journ. de Pharm.*

On Hydrocyanic acid. By M. Henry, Jun.—The medicinal hydrocyanic acid is an article to which great attention should be paid by druggists, on account of the accidents it may occasion and the difference of its operation, if its composition be not identical. For the purpose of obviating these as much as possible, Magendie has ordered in his formulary, the preparation of this medicine, with the anhydrous acid of Gay Lussac, diluted with a known proportion of water. But the preparation of the anhydrous hydrocyanic acid always exposes the operator to some danger, and the product is often decomposed in a few days, without any apparent cause. Having remarked for some years past that the hydrocyanic acid obtained by the process of M. Gea Pessina was easily preserved, I endeavoured to ascertain the density of the medicinal prussic acid of Magendie, in order to reduce that of Pessina to the same standard, in order that it might be substituted for it in the practice of medicine.

For this purpose I prepared a certain quantity of hydrocyanic acid according to the process of Gay Lussac; this still retained some traces of water, and its density, instead of being 0.7058, was only 0.7210. Tested with one of the salts of silver it furnished a cyanuret, which, when washed and dried, weighed 4.081 for each gramme of the acid, the cyanuret being formed of

Silver, 1 atom	1351.607
Cyanogen, 2 atoms	329.911

It is evident that 100 of the cyanuret of silver contains 20.34 of anhydrous acid. The above acid therefore contained in each gramme 4.952 of anhydrous acid; that is, it was nearly pure. To 5 grammes of this, 42.5 of pure water was added, which formed an acid of the strength of that of Magendie's formulary. The density of this was 0.9843, and each gramme contained 0.19 of real anhydrous acid (nearly 4 grains). Hence by diluting the acid of Pessina with sufficient water to give it a density of 0.980 to 0.984, a medicine will be obtained precisely similar to that

ordered by Magendie, but much more readily made, and which can be preserved without alteration.—*Journ. de Pharm.*

Extraction of the gelatinous principle of Iceland moss.—M. Beral gives the following directions for making pure jelly from the Iceland moss.

Iceland moss washed clean in cold water	32 ounces
Water	16 pounds.

Boil this mixture for an hour, constantly stirring it, remove it from the fire, pour part of it into a horse hair sieve, placed over an earthen pot, and gradually press it in such a manner as to force the gelatinous part through the interstices of the sieve. Preserve the residuum, and treat the rest successively in the same manner. Boil the residuum in eight pounds of water and proceed as before. Then heat the whole of the gelatinous portions so as to render it quite fluid, and pass it through a thick muslin strainer. To this gelatinous liquid is to be added eight pounds of rectified alcohol; when the whole is cold again, pour it into a horse hair sieve and stir it constantly. Wash the gelatinous matter left on the sieve with four pounds of alcohol, again strain, and press it with the hand to separate as much of the alcohol as possible. The result will be an elastic mass composed of gelatine and alcohol, weighing about two pounds.

Two pounds of lichen thus treated will furnish thirty-two ounces of alcoholic gelatine, which are reduced to sixteen ounces by simple pressure, and to four ounces by drying in a stove. In the latter state this gelatine is hard, corneous, soluble with difficulty in boiling water, and hence cannot be used to make a jelly.

<i>Sweetened gelatine of Iceland moss.</i> —R. Alcoholic gelatine	2 lbs.
Refined sugar	4 lbs.

Mix well in a marble mortar, and dry by a gentle heat.

<i>Jelly of Iceland moss.</i> —R. Sweetened gelatine	4 oz.
Water	6 oz.

Boil till reduced to eight ounces; strain and flavour as may be deemed expedient. This can be made in ten minutes. It has no bitterness, is agreeable to the taste, and possesses all the properties of the lichen.—*Journ. de Pharm. June 1831.*

Anhydrous Crystals of Sulphate of Soda.—If a drop of a solution of sulphate of soda be placed upon a glass plate and allowed to evaporate spontaneously, it will leave crystals which may be distinguished by their form and ultimate efflorescence, as being the salt in question. Most of the potash and soda salts may be distinguished as to their base by such an experiment. They are easily converted into sulphates by a drop or two of sulphuric acid and ignition, and then, being dissolved and tried as before, will yield crystals which may be known by their forms, and more especially by their efflorescence, if of soda, and their unchangeable state, if of potash. This test is, however, liable in certain circumstances to uncertainty, arising from a curious cause. If the drop of solution on the glass be allowed to evaporate at common temperatures, then the efflorescence takes place and the distinction is so far perfect; but if the glass plate with the drop upon it be placed upon a warm part of a sand-bath or hot iron plate, or in any other situation of a certain temperature, considerably beneath the boiling point of the solution, the crystals which are left upon evaporation of the fluid, are smaller in quantity, more similar in appearance to sulphate of potash, and finally *do not* effloresce. Upon examining the cause of this difference, I found they were anhydrous, consequently incapable of efflorescing.

Hence it would appear, that a mere difference in the temperature at which a solution of sulphate of soda is evaporated, will cause the formation of hydrated or anhydrous crystals at pleasure, and that, whether the quantity of the solution be large or small. This indeed might have been expected from that which takes place when hydrated crystals of sulphate of soda are carefully melted; a portion dissolves, and a portion separates, the latter in an anhydrous state. I find that, if it were desirable, crystallized anhydrous sulphate of soda might easily be prepared for the market; though as the pure salt is now but little used, it is not likely this condensed form will be required. Whenever a soda salt is to be distinguished from one of potash, in the manner above described, this effect of temperature must be carefully guarded against.—*Quarterly Journ. Sci. and Arts.*

On Gallic Acid. By M. Braconnot.—M. Braconnot had recommended the preparation of gallic acid by a process in which the tannin present in the infusion of galls was removed by gelatine; but M. Berzelius thought that such gallic acid was chemically combined with tannin, and that pure gallic acid could be obtained only by sublimation. M. Braconnot has therefore made further experiments, and finds that the two substances differ, and that, not from the presence of tannin in the unsublimed acid. The latter he calls pure gallic acid, and the other pyrogallie acid.

When very white gallic acid, giving no indication of tannin to gelatine, was moderately heated, it became a brown liquid, which crystallized on cooling, and which, dissolved in water, contained still gallic acid and a brown substance which precipitated gelatine abundantly. Thirty parts of dry white gallic acid, being subjected to a higher heat, gave only $3\frac{1}{2}$ parts of sublimed gallic acid: though very white, its solution precipitated gelatine. The residue, when dissolved, gave a brown liquor, which became much deeper with persulphate of iron, and blue-black with protosulphate (these being characters of pyrogallie acid, and not of gallic acid); and it also abundantly precipitated gelatine. Hence, heat appears to rearrange the elements of gallic acid, so as to produce a peculiar variety of tannin and pyrogallie acid.

Pyrogallie acid reddens litmus paper, though less than gallic acid; it has a cool, bitter taste. It dissolves in $2\frac{1}{2}$ parts of water, at 55° F., whilst gallic acid requires 100 parts at the same temperature. When re-sublimed, pyrogallie acid is decomposed almost entirely, producing tannin and charcoal. It dissolves in ether. Its aqueous solution is colourless, but by exposure to air becomes coloured, and deposits ulmin, being entirely decomposed in a few days if water be added as evaporation proceeds. Persulphate of iron added to it is immediately reduced to protosulphate, and a tannin matter is formed. Protosulphate of iron produces a blue-black liquor. These actions are very different from those of gallic acid, which with protosalts of iron produce no change, and with persalts produce a fine blue colour.

Pyrogallie acid slightly heated with strong sulphuric acid does not become coloured, and is not sensibly decomposed. Pure gallic acid treated in a similar way became coloured, but on adding water was found not much altered; no tannin was produced. Strong sulphuric acid and a higher temperature converted the gallic acid into ulmin; no tannin was formed.

Every endeavour to form gallic acid (upon Berzelius's views), by combining pyrogallie acid and tannin, failed. From all these facts, M. Braconnot concludes, 1. That gallic acid procured in the humid way, and cleansed by animal charcoal, is pure. 2. That heat converts it into tannin and pyrogallie acid. 3. That gallic acid cannot be produced from tannin and pyrogallie acid.—*Annales de Chimie*, xlv. 206.

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Original Communications.

ARTICLE XL.—On *Frasera Walleri*. By R. Eglesfeld
Griffith, M.D.

Nat. ord. GENTIANEE.

Sex. Syst. TETRANDRIA MONOGYNIA.

FRASERA. *Calyx*, deeply 4-parted. *Corolla*, 4-parted, spreading; segments oval, with a bearded orbicular gland in the middle of each. *Capsule*, compressed, partly marginated, 1-celled. *Seeds*, few (8 to 12), imbricated, large elliptic, with a membranaceous margin.—*Nuttall*.

F. Walleri. *Root*, biennial. *Stem*, 3 to 5 feet high, erect, subquadrangular, smooth. *Leaves*, opposite and verticillate, oblong, lanceolate, the lower ones a foot long, and more than three inches broad. *Flowers*, verticillate, peduncles, 1-flowered, unequal. Segments of the *calyx* linear, lanceolate, acute. *Corolla* greenish-yellow, speckled with purple, segments acuminate, with an oval or orbicular fringed gland on the centre of each. *Stamens*, shorter than the corolla, alternating with its segments; *filaments* subulate, anthers large, yellow, oblong. *Germen*, oblong, attenuated into a short style. *Stigma*, bifid. *Capsule* much compressed, oval, acuminate with the persistent style.—*Torrey*.

Synon. *Suertia difformis*, Lin. *Sw. fraseri*, Smith in Rees's Cyclop. *Frasera carolinensis*.—*Walter*.

F. Walleri. Mich. Pursh. Nuttall, Torrey, &c. *F. verticillata*. Drake, Rafines. *F. officinalis*, B. Barton.

VOL. III.—2 K

This beautiful and stately plant, which is abundant to the west, north and south of the Alleghany ridge, is not found on the Atlantic side. Its peculiar habitat, however, is variously described by different botanists. Michaux states that he found it in wet or swampy places; Pursh, that it occurs in swamps, and on the borders of lakes; Nuttall, that it is abundant in dry and open woods; Dr Short says it grows in barrens or prairies, and Rafinesque, in rich, woody lands, open glades and meadows.

It is one of the tallest of our native herbaceous plants, sometimes attaining an elevation of 10 feet, with a pyramid of flowers of three or four feet in length. From the great size of the spike of the flowers, it is difficult to give a good representation of it; that which we now offer, though correct in its details, gives but a faint, and indeed an erroneous idea of the whole plant, which deserves cultivation, if not for its medicinal virtues, at least as an ornament to our gardens. Rafinesque observes that it is not a biennial, as it does not throw up a flowering stem until the third year; all the other botanical authors we have consulted, however, agree in considering it as a biennial.

The generic name of *Frasera* was bestowed on it by Walter in commemoration of Mr John Fraser, a botanical collector and nursery man, to whose industry and exertions the gardens of England were indebted for numbers of rare plants. Linnæus had previously described it as *Swertia difformis*, probably from defective specimens; at the same time it should be noticed, that it is very closely allied to this genus, especially in its fruit, added to which it often varies in the number of stamina and parts of the corolla. Dr B. Barton states "that flowers with five stamens are very frequently met with, and six stamens occasionally occur."

It has received a variety of common names, as American Colombo, Columbia, Indian lettuce, yellow gentian, golden seal, Marietta root, &c., but is generally known under the first appellation. The discovery of this interesting plant is due to the late William Bartram, who speaks of it in his tra-

vels under the name of Indian lettuce; he says "a very singular and elegant plant, of an unknown family, called Indian lettuce, made its first appearance in these rich vales." His description of it is very exact, though it appears that he examined one of the anomalous varieties, since he states that "the flowers are of the hexandria, and divided into six parts or petals."

This plant has obtained considerable celebrity for its remedial virtues, and is extensively employed in some parts of the United States as a tonic bitter. The part used is the root, which is large, yellow, rugose, hard, horizontal and spindle-shaped, with but few radicles or fibres. These roots, when in a fresh state, sometimes weigh several pounds. As found in the shops, they are pieces somewhat resembling the true Colombo in appearance, having a thick yellow bark, and a yellowish spongy wood. The taste is pure bitter, without any aroma, analogous to that of gentian, but not as powerful. It may be distinguished from the true or East Indian Colombo, by its whiter colour, lighter texture, and especially its taste. Mr Slotze, a German pharmacist, also states that the tincture of the genuine root is not effected by a solution of the proto-sulphate or pro-muriate of iron, whilst it gives a dirty gray precipitate with the tincture of galls; the tincture of the *Fraxera*, on the contrary, affords a dark green precipitate with these metallic salts, and is not acted on by the tincture of galls.

As is the case with most of our native articles of the vegetable materia medica, much diversity of opinion appears to exist as to the value of the medicinal virtues of this plant; some authors extolling it in the highest terms, and considering it as equal, if not superior, to the genuine Colombo; whilst others, on the contrary, deem it of but little utility, and class it far below chamomile or centaury. As is generally the case in such statements, both have been led away by preconceived opinions, and have permitted themselves to be influenced by theory rather than by facts. As regards the article under consideration, it appears probable that although

it is much inferior in bitterness and tonic properties to the true Colombo, that it is an efficacious bitter, capable of producing the usual effects of this class of remedies when properly administered. It should be noticed, however, that its tonic powers are only developed when the root has been perfectly dried, as when in the recent state it proves both emetic and cathartic.

Dr Zollickoffer states, "as far as my experience goes, I am able to speak in favour of its medicinal operation. In several cases of a relaxed state of the stomach and bowels, in which I have prescribed it, I have found it competent to restore the appetite, and increase the digestive powers very considerably."

Dr Hildreth of Ohio asserts, that, from the experiments he has made with it, he is induced to believe it fully equal if not superior to the imported, and mentions a case of gangrene of the lower extremities, in which it proved successful after bark and other remedies had failed.

Dr Drake of Cincinnati made some experiments with the root, to ascertain its chemical composition, which, however, are far from satisfactory; he says "it gives out its bitterness both to aqueous and alcoholic menstrua, but more fully to the latter; the reverse of which is the case with Colombo. Its spirituous tincture suffers decomposition upon the addition of water, indicating that it contains resin, which the Colombo does not, or at least in any considerable quantity, and the addition of a decoction or tincture of galls to its watery or spirituous infusion causes no precipitate of cinchonin, one of the chief constituents of Colombo."

In the Medical Flora of Mr Rafinesque, a work we are induced to quote, from its containing much valuable information on our native plants; though unfortunately so mingled with wild hypothesis and unsubstantiated assertions, as to render it an unsafe guide; it is stated, "I suspect, that the analysis of the *Fraseria* has not been accurate, and that it contains Inuline or a peculiar substance *Fraserine*, intermediate between inuline and *Fraserine*." As this suspicion of

the author is based on no chemical analysis, it should have no weight with any future experimenter. For although in science we should be extremely scrupulous in giving every discoverer the full credit for his researches, we should be as careful in disregarding the mere speculations of those who thus claim, by anticipation, a reward which is only due the real labourer in the domains of knowledge. This grasping at fame, and this eagerness to describe as new, subjects or articles that have never been investigated, or perhaps even seen, by the person who thus gives them "a habitation and a name," is the bane of science, and should be treated with the contempt it so justly merits.

The *Fraxera* may be used in powder, decoction, infusion or tincture.

ARTICLE XLI.—*On the Bitter Principle of Podophyllum
Peltatum.* By William Hodgson, Jun.

[Read before the College, November 29, 1831.]

The recent improvements in the analysis of vegetable substances, and the consequent extension of our acquaintance with the active constituents of medicinal plants, may almost be said to have elevated vegetable chemistry to the rank of a distinct branch of science. This branch, however, is yet in its infancy; and has, hitherto, in comparison with the exhaustless number of its objects, but few facts at its command. The accurate examination, especially, of those articles of our *Materia Medica* which are peculiar to this country, has been sparingly entered into; so that it seems the more important that every new step which may really add to the stock of our knowledge on this subject, should be carefully noted, even though the practical result may not

at once be apparent. With this view, I am induced to submit to the College the following brief notes of an imperfect examination of the root of the *Podophyllum peltatum*, and of the extraction of a proximate principle which appears to me to be new, and peculiarly characterized.

One pound of the dried root was boiled in a gallon of water for a quarter of an hour, and the liquor then strained off and the residue pressed. The decoction was somewhat turbid and of a brown colour. Two fluid ounces of *aq. ammoniæ* being thrown in, rendered it perfectly limpid, and presently produced a crystalline earthy precipitate, which when dry weighed 75 grains. The clear liquor was then evaporated to about one fourth of its original bulk. The free ammonia had of course escaped. On cooling, a pellicle formed on the surface, and a semi-crystalline flaky matter was deposited, copiously enveloped in jelly. In order to separate the semi-crystalline matter, I diluted the whole with cold water, and decanted off the clear liquor, which conveyed away with it most of the gelatinous mass. That which remained was nearly dried, and treated with cold alcohol of sp. gr. 817. The solution thus obtained was filtered, and evaporated by a water bath, depositing towards the end of the process the original semi-crystalline substance in the form of a brownish yellow granular mass. Suspecting that it was not yet in a state of purity, and having observed its sparing solubility in cold water, I subjected it to the boiling heat in distilled water, when it entirely dissolved, except a slight portion of impurity. As soon as the solution was allowed to cool, this substance separated in extremely small flocculent crystals, slightly heavier than the water.

I then determined to try another process. One pound of the root was boiled in about a gallon of water mixed with quicklime. The decoction, which was of a fine yellow colour, was strained, and one ounce of sulphate of zinc in solution was added, which precipitated the lime. The clear liquor was then evaporated till the residuum acquired the

consistence of an extract, which was treated with cold alcohol of sp. gr. 817. The alcoholic solution was filtered and evaporated to dryness, and the residuum boiled in distilled water. On cooling, the same semi-crystalline substance was obtained as by the first process. This was washed with a little cold distilled water and cautiously dried.

When dry, this substance is in pale brown scales of considerable lustre; is easily pulverized; is unalterable in the air; and has a strong bitter taste, very permanent, but not at first very apparent, owing probably to its difficult solubility, as the alcoholic solution is excessively bitter. It is copiously soluble in strong alcohol, and much more so in boiling than in cold water; the aqueous solution retaining when cold about a grain to the ounce. It is also soluble to some extent in sulphuric ether. When dry it is devoid of odour; but the solutions have a peculiar smell, somewhat resembling that of the boiled root. By the addition of muriatic acid, it separates from its aqueous solution more readily and in a finer state of division than when it falls by the mere cooling of the water in which it has been dissolved. Treated with nitric acid, it dissolves rapidly with effervescence, producing a rich deep red colour. With sulphuric acid it gives an olive or green colour, passing afterwards to a purple. Under some circumstances, which I have not yet been able to determine, this purple has been of a very delicate tint. Boiled in this acid it decomposes and produces a rich crimson fluid, the colour of which is destroyed by the addition of water and changed to yellow by solution in alcohol. Exposed to heat alone, it fuses, blackens and dissipates in a dense smoke. This substance in some of its habits bears a remarkable resemblance to salicine, particularly in affording a purple colour with sulphuric acid.

ARTICLE XLII.—*On the Green Colour and Nature of the colouring Agent of the Water of the Delaware and Chesapeake Canal, near the first lock on the Chesapeake side. By Elias Durand.*

Travellers between Philadelphia and Baltimore, through the above canal, seldom fail noticing the beautiful green colour of the water, between the first lock on the Chesapeake side nearly up to the bridge at the deep cut. This colour is generally ascribed to the presence of copper; and many are the stories related respecting the noxious properties of that water, which neither man nor beast dare touch with their lips; in which no fish or insect dwells, nor plant grows, &c.

In a late excursion I made to Baltimore, my attention being directed to the beautiful green colour and perfect transparency of the water, and my ear attentive to the speculations of several passengers respecting the cause of the extraordinary appearance of this inland sheet of water, I resolved to fill a bottle and bring it with me for the purpose of analysing it.

This water gives by tests no indication whatever of a coppery substance being held either in solution or suspension. Its taste is inky and denotes at once, to an experienced palate, the presence of a salt of iron. It slightly changes the colour of litmus paper, and the hydrochlorate of baryta throws down a white precipitate. The water in its natural state, as well as that previously tried with the hydrochlorate of baryta, is slowly and weakly affected by gallic acid and ferrocyanate of potash; but when evaporated to a certain degree, the action of both these reagents becomes more powerful, and the hydro-sulphate of potassa forms a notable black precipitate. By comparing a weak solution of the sulphate of the protoxide of iron with the canal water, I estimate that the latter contains about 1-10,000th of this salt in solution.

These few experiments, although made on one pint and

a half of the canal water, are sufficiently conclusive as to the nature of its colouring agent. The sulphate of the protoxide of iron held in solution, is afforded by the spontaneous decomposition of some pyrites of iron, which are perceived along the banks of the canal. This decomposition takes place by the simultaneous action of the air and moisture, by which both sulphur and iron absorb oxygen, and are transformed in sulphuric acid and protoxide of iron; but as the quantity of sulphur contained in the sulphuret of iron yields more sulphuric acid than is wanting for the saturation of the protoxide of iron, the water becomes consequently slightly acid; hence its action upon litmus paper.

ARTICLE XLIII.—*On Sugar from the Seckel Pear.*

[The following communication from Mr Brasier to the College of Pharmacy, was deemed of such importance as to be referred to a committee, whose able and detailed report we also have the pleasure of laying before our readers. Should experiments on a large scale prove equally satisfactory as those of Mr Brasier, there can be but little doubt of the great value of this fruit in the manufacture of sugar. The greatest drawback to its extended propagation for this purpose, is the time required for the tree to come to maturity, though, when an orchard has once reached the bearing age, the expence of procuring the sugar from the fruit will be incomparably less than that incurred either in the cultivation of the cane or of beet roots. We trust in the course of the ensuing year to present the results of further experiments on this subject, and we would suggest to such of our readers as have the opportunity, the value of comparative examinations of the juice of various other varieties of the same fruit.]

Philadelphia, October 20th, 1831.

The remarkable sweetness of the Seckel pears, which are cultivated at the country residence of my father, induced me to attempt to obtain sugar from them. In 1826, I commenced experimenting on them, with a view of separating the saccharine matter they contained: after treating the juice with lime, I concentrated it, until its boiling point stood at 230° Fahrenheit (the degree required for crystallizing sugar), and obtained a syrup of a pleasant taste and of the colour of fine molasses.

The two succeeding years, I obtained nearly the same results, but the syrup, as in the other case, would not crystallize; I have some at present, which still remains in the same state.

But in 1829, the season being favourable for fruit, I procured some very fine, the juice of which (it was a grayish colour with a light tinge of orange, which last colour deepens in a very short time) I heated nearly to the boiling point, neutralized and separated the feculent portion, by treating it with an excess of lime, which, when precipitated, left a clear aqueous syrup of a light straw colour, of the specific gravity of nearly 1075. I then neutralized the excess of lime remaining in the syrup, concentrated and clarified it with ivory black, and reduced it until its boiling point marked 220° Fahr. Having been prevented from attending to it for a few days, when I proceeded to terminate the concentration, I perceived that it had become so glutinous and ropy, I feared it would burn in the operation; I therefore put it into white glass bottles. It was clear and of a fine yellow colour.

Eighteen months after this, some fine white crystals had formed, resembling those from sugar cane (rock candy).

Last summer, I treated some juice in the same manner, but owing, I believe, to the unsoundness of the fruit, (the season being unfavourable,) the syrup was dark, and acquired a taste from the ivory black, which was of inferior quality. I then exposed this syrup in evaporating pans, in a hot atmosphere; it thickened, but has not yet crystallized,

whilst the glutinous syrup of 1829 crystallized almost entirely, although the crystals were darker than those formed while cold.

Business calling me from the city, I submit to you the experiments, that you may continue them if you think proper, and take the liberty of calling your attention to a fruit, which, though of a delightful flavour, is scarcely known beyond the vicinity of this city. I estimate its value for sugar, from the knowledge that its juice can be as easily and cheaply obtained as that of the apple, and that it contains near two pounds liquid sugar per gallon, whilst its agreeable flavour and sweetness leave little doubt of the quality and strength of the perry or vinegar that could be obtained from it.

That these feeble instructions may lead to the creation of a new branch of industry, is the sincere wish of

Your obedient servant,

AMABLE J. BRASIER.

The committee to whom was submitted the sugar and syrups prepared by Mr Brasier, and presented by him to the College, beg leave to report:

That so far as they have been able to ascertain, the sugar obtained by Mr Brasier from Seckel pears, possesses all the properties of the crystallized cane-sugar, and in no respect does it seem to differ from it. Its taste, crystallization, solubility in water, &c. are exactly the same. Three samples have been submitted to the College; the one, very white and in regular crystals; another, a little inferior; and the third sample, in a granular state of a grayish colour, possessing the appearance and smell of dry Brazil sugar of an inferior quality.

Mr Brasier left for the committee, two bottles of syrup made from the Seckel pear; one, containing the syrup made in 1829, and which afforded the samples he produced; the other, was the syrup he made last year. The principal object of the committee was the investigation of these two syrups, with the view of depriving them of their glutinous proper-

ties, as this was probably the only cause of the difficulty in the one case, and the impossibility in the other, of obtaining crystallized sugar. Your committee having at their disposal but a small quantity of these syrups to experiment with, had little hope of success; but they have not been deterred from undertaking the task, though their experiments may have proved few and unsatisfactory. They expect to be able next year to institute a series of new experiments upon the fresh juice of the Seckel pear, and to submit to the College a more ample and satisfactory report than this. Mr Brasier's discovery involves, undoubtedly, a very important question—whether the northern climates are not as capable of producing sugar as the tropical. We hope that your committee will receive the assistance of persons interested in the promotion of science, manufactures and national wealth, and that scientific and enterprising men, led towards the same object, will communicate to us the result of their own labours.

The first syrup made in 1829 is perfectly transparent, of a light straw colour, and holding in suspension a considerable number of small prismatic crystals; its consistence is viscous and ropy, and its sp. gr. 1.365; heated in a sand bath it became more fluid, but still retained its ropiness; the crystals which floated in it when cold, fell down when heated; owing to its viscosity, it mixes with difficulty in cold, but dissolves readily in warm water. In contact with sulphuric acid, it acquires a deep brown colour, without emission of sulphurous acid: nitric acid decomposes it with production of nitrous vapours and formation of oxalic acid: muriatic acid did not seem to have any action upon it. Sub-acetate of lead and alcohol rendered it turbid and precipitated a flocculent matter.

Six drachms of warm syrup were mixed with three ounces of alcohol (distilled from grain) of 35° of Baume's areometer; the mixture became turbid, and a white precipitate of flocculent matter subsided gradually; this precipitate was removed by filtration and carefully washed with tepid alco-

hol. The alcoholic liquors were united and slowly evaporated at a heat of about 160° . When reduced to the crystallizable point, the syrup had lost all its ropiness: carried to dryness it produced five drachms of very white sugar, impregnated with the smell of whiskey, and slightly contaminated with a little uncrystallizable syrup. After washing this sugar with alcohol, it was redissolved in distilled water, and the syrup, reduced to the crystallizable point, was entirely deprived of its former ropiness, and deposited, on cooling, a number of small crystals of pure sugar; what remained on the filter was found, next morning, to be a hard substance, much reduced in size, and weighing four grains only. This substance, examined with the glass, presented the following characters—it was of a red brown colour, shining and horn-like on the side exposed to the contact of the air; on the other side it appeared spongy, porous and of a lighter colour: its sp. gr. was great. Thrown into boiling water, it did not dissolve, but became white and considerably larger; it continued, however, to sink in water. This substance had many of the characters of gluten, but submitted to the action of the fire it did not evolve an ammoniacal odour; it burnt with a black smoke, and emitted an odour similar to lignia, leaving for residuum a piece of charcoal about one fourth its former bulk; another piece withdrawn from the boiling water and submitted to a gentle heat gradually resumed its former bulk, hardness and colour. Iodine had no action upon this substance, but hydrochloric acid dissolved it completely.

The brown syrup of 1830 was treated in the following manner—two ounces were dissolved in one ounce of boiling distilled water, and then mixed with six ounces of alcohol of 35° . The mixture became turbid, and a copious precipitate fell down; this precipitate separated from the alcohol, did not adhere to the fingers, and could be malaxated like warm molasses candy. This precipitate dissolved easily in boiling water, but sweetened it very little. A portion of it permitted to dry in the air, acquired a deep brown colour, shining at the surface, and spongy inside, of a sweetish

taste, somewhat like the flesh of a dry raisin. Thrown upon an ignited coal, it swelled up, took fire, and burnt with the smoke and smell of a woody substance, but without emitting either an ammoniacal or burnt sugar smell.

The same filtered solution was then treated with sub-acetate of lead, which threw down a very copious precipitate; the liquid became considerably lighter in colour, and after being filtered, a stream of hydro-sulphuric acid was passed through it, to precipitate the lead; it was filtered again, after ascertaining that it was entirely free from lead. The liquor now reddened litmus paper, but the acidity was soon removed by boiling. It was then evaporated to the consistence of a thick transparent syrup, of the colour of light Madeira wine, which was set aside to crystallize, but did not, after remaining several days.

It may be inferred from the above experiments, that the difficulty experienced by Mr Brasier in crystallizing his syrup of Seckel pear, was owing principally to a peculiar mucous substance which he did not separate sufficiently by the process he followed in his operation, and which rendered his syrup viscous and ropy. The syrup made in 1830, evidently contained a much greater portion of this mucilage than the other, and was, besides, as we learned, submitted to a very protracted action of heat, which is known to deprive solutions of sugar of the property of crystallizing. We have hardly any doubt that a better process than that resorted to by Mr Brasier may be applied to the manufacture of sugar from the Seckel pear, and we are disposed to think that the employment of the sub-acetate of lead, instead of lime, for precipitating the vegetable, mucous, and colouring principle, will obtain the desired object. This means has already been proposed for the purification of cane and beet sugar, but as the salts of lead combine with sugar, and are separated from it with difficulty, it was abandoned. However, it is asserted in the *Dictionnaire des Drogues*, that some manufacturers have succeeded in this desideratum, and

that this method will, before long, produce a great revolution in the art of sugar refining.

Now the question is, whether the manufacture of sugar from the Seckel pear may become an object of industry and of advantage to the country. The solution of this important question is yet beyond our reach; our data, in reference to this point, are altogether insufficient, as we have no means of establishing a comparison between the quantity of sugar that two similar portions of land might afford, if cultivated, one with sugar cane, and the other with Seckel pear trees, nor between the relative costs of cultivation and manipulation. However, if we compare the richness of the juices of sugar canes, beet roots and Seckel pears, we will find that the last possesses a great superiority over the others. According to Mr Gillmer (*Dictionnaire des Drogues*), Mr Achard, a distinguished chemist, and a manufacturer of beet sugar, obtains 4 to 4½ per cent of sugar from the juice of red beets. Edwards, in his history of the West Indies, relates that the average quantity of sugar obtained from the juice of the cane, is about 10 per cent; now Mr Brasier tells us that one gallon, or 8lbs. of Seckel pear juice yields 2lbs. of liquid sugar, that is, 24 ounces of dry sugar* or 18.75 per cent, about twice as much as the juice of the cane. Thus, if the assertion of Mr B. be correct, which we confidently believe, a Seckel pear tree, producing four bushels of pears of 60lbs. to the bushel, would yield three-fourths their weight of juice, or 180lbs., which would produce 34lbs. of dry sugar; and one acre of ground, planted with 100 Seckel pear trees, each producing 4 bushels of fruit, will yield 3400lbs. of dry sugar,† without preventing the soil from affording other agricultural products.

The genus *Pyrus* (pear tree) belongs to the class Icosan-

* 1lb. sugar, made up in syrup, gives one pint of the latter, weighing 1lb. 5oz. avoirdupois.

† Each face of a square acre, containing 4840 square yards, is 69.6 yards long, or 208 feet. By leaving 14 feet free from the edge of each of the faces of the square acre, to the first row of trees, and planting the trees at 20 feet distance from each other, it is found that one square acre will contain ten rows, of ten trees each.

dria, order Pentagynia of the artificial system of Linnæus, and to the family Rosaceæ of the natural order. It was divided by Linnæus in three divisions; the *Pyrus* proper, *P. malus* and *P. Cydonia*. Persoon has separated the latter from the genus *Pyrus*, and formed a new genus under the name of *Cydonia*. From five species of *Pyrus* described by Persoon, the *P. communis* is the only one bearing fruit, which, by cultivation, are susceptible of becoming eatable.

In the natural state, the pear tree acquires considerable dimensions, and its branches are frequently terminated by long, straight and hard prickles; its fruit is acerb, hard, and its flesh granular. This single species has, by cultivation, produced a great number of varieties, which are propagated by grafting, and distinguished by difference in shape, size and colour, and especially by the taste of the fruit. Tournefort arranged these different varieties into three different classes; the Summer, the Autumnal, and the Winter pears. The pear which is the subject of this report, belongs to the second class. It is known by the name of Spicy, Musk, or Russett pear, and is called by the French, *Rousselet de Rheims*.

The Seckel pear derives its name from a gentleman of this city, who, it seems, was the first who paid particular attention to the fruit, and to spreading the tree among his friends and the public. However, Dr D. Hossack, in an account of the Seckel pear, which was published in the third volume of the Transactions of the Horticultural Society of London, asserts, on the authority of a respectable friend, that seventy-two years ago, this pear was grown in the neighbourhood of this city, by a person by the name of Jacob Weiss, who had obtained the tree at a settlement of Swedes which was early established in the vicinity of Philadelphia, and that most probably Mr Weiss and the father or grandfather of Mr Seckel were intimate, as both families were Germans, and of that rank in society which might be likely to lead to such an acquaintance. The conjecture therefore is, that under such circumstances, Mr Seckel's family ob-

tained the grafts from Mr Weiss's tree ; however this may be, Mr Seckel deserves the credit of having propagated this delightful fruit, and of having paid the greatest attention to the cultivation and melioration of the tree.

That the Seckel pear tree is a native variety of the neighbourhood of Philadelphia is incontestible, from the circumstance that it is hardly known out of the vicinity of this city, and because it has never been described by European horticulturalists, except from the descriptions of our own authors, and as having been procured from this vicinity. There are already several sub-varieties, slightly differing in size, colour and taste.

It is thus described by Mr Coxe, in his work on the fruit trees, published in this city in 1817. "The fruit is generally small, round at the blossom end, diminishing with a gentle swell towards the stem, which is rather short and thick ; the skin is sometimes yellow, with a bright cheek, and smooth ; at other times it is a perfect russett without any blush ; the flesh is melting, juicy, and most exquisitely and delicately flavoured. The time of ripening is from the end of August to the middle of October. The tree is singularly vigorous and beautiful, of great regularity of growth, and rich in foliage, very hardy, possessing all the characteristics of a new variety, and, as a native tree ; it is but little affected by that species of blight, commonly called fire blight, which, in this country, destroys so many pear trees of the imported varieties." A good representation of this fruit, copied from a drawing executed by Mr Coxe's daughter, has been appended to the account given by Dr Hossack, and published in the Transactions of the London Horticultural Society.

The Seckel pear tree may be cultivated, and will flourish, on almost any species of soil ; it should always be grafted or inoculated on the wild pear tree, as grafting on the quince tree subjects it to the same diseases with which this tree is generally affected in this country. It should be four or five years old when planted in the orchard, and each tree at a distance of from eighteen to twenty-five feet. Many horticul-

turalists whom we have consulted, prefer the smallest distance or twenty feet at most, as by this method the trees protect each other from the wind, frost, sunbeams, &c.

It bears fruit at from five to six years old ; at that age the product is trifling, but from eight to twelve years, it increases considerably ; when fifteen years old they are in full bearing, increasing, however, until they are twenty-five. Their average product, from fifteen to twenty-five or thirty years old, is variously reported, and there is generally one good and one bad year. The minimum product seems to be, on an average, four bushels of fruit.

It acquires considerable size, and lives forty, fifty, and as long as sixty years. The general experience is that it is very little subject to the diseases afflicting other trees, more easy to cultivate, and bearing generally more fruit than any other.

Your committee have thus given as succinct an account as practicable to do justice to the subject, although they have extended their report far beyond the limits they had originally prescribed ; yet they would do injustice to Mr Brasier, as well as their own feelings, if in concluding the report, they omitted to say, that they consider him entitled to great praise for the talents, perseverance and ingenuity he has evinced in the prosecution of the experiments, the results of which they have been examining, as well as those which have enabled him to saccharify *directly*, rye, and other kinds of grain, the sweet and common potato, and other vegetable substances containing fecula, by means of the combined action of heat and water, acidulated by sulphuric acid, and afterwards to convert the liquid sugar thus obtained into alcohol, and cannot but believe that the ultimate results of them will prove highly important to the country.

E. DURAND.

JOS. SCATTERGOOD.

ARTICLE XLIV.—*On Nitro-muriatic or Nitro-hydrochloric Acid.* By *Daniel B. Smith.*

The use which is occasionally made of this preparation in medicine, will perhaps render the following observations interesting to the members of the College. Authors differ greatly in their statements of the proportions in which the two acids which form this compound should be mixed, in order to dissolve the precious metals. Thomson recommends one part of nitric and four parts of hydro-chloric acid to be used for dissolving gold, and one part of the former and three parts of the latter for dissolving platinum. Turner directs one part of nitric and two of hydrochloric acid; while Henry, and after him Ure, reverse these proportions. The same discrepancy exists among the Pharmacopœias in their formulæ for this preparation, which is the more surprising, as the proportions can be rigorously determined. The theory of the action of nitric and hydrochloric acids upon each other is, that the hydrogen of the latter combines with one proportion of the oxygen of the former to form water, leaving the chlorine free, and converting the nitric into nitrous acid. In order that the decomposition may be complete, the acid must be used in the proportions of their atomic weights, viz. 37 parts of hydrochloric acid to 54 parts of nitric acid. In order to ascertain in what proportions the officinal acids of the American Pharmacopœia should be mixed to form nitro-muriatic acid, we must observe that the nitric acid, the specific gravity of which is 1.5, contains, according to Dr Ure, 79.7 per cent of dry acid. The hydrochloric acid has a specific gravity of 1.15, which is equivalent, according to the same authority, to 30.29 per cent of pure acid. Now, as 54 (atomic number of nitric acid) : 37 (atomic number of hydro-chloric acid) :: 79.7 (dry acid in 100 parts of nitric acid) : 54.6 = the quantity of absolute hydrochloric acid requisite to saturate it. But as 100 parts of the officinal acid contains only 30.29 per cent of absolute acid, we must use 180 parts by weight,

in order to convert the whole of the nitric into nitrous acid, and to obtain all the chlorine which 100 parts of the nitric are capable of disengaging. These proportions are as five of nitric to nine of hydrochloric acid. The mixture will contain rather less than 19 per cent of chlorine.

If we use the strongest acids that are readily to be obtained, viz. nitric acid of 1.5, and hydrochloric acid of 1.192, we shall find the proportions to be 100 by weight of the former to 141 of the latter, or nearly as five to seven. The combination contains 22 per cent of chlorine.

The ordinary hydrochloric acid of commerce, of a good quality, is of about the officinal strength, viz. 1.15, and good double aqua fortis may be taken at 1.34. The proportions in which these acids should be mixed to form nitro-muriatic acid, will be found by the above method of calculation to be 25 parts by weight of the latter to 26 of the former. The chlorine forms 15 per cent of this mixture.

The Dublin College is the only one of the British colleges that has given a formulæ for this preparation. Its nitric acid is 1.49, and its hydrochloric acid 1.16, and it directs *one measure* of the former, and *two measures* of the latter to be mixed, in order to form nitro-muriatic acid. This is sufficiently correct for practice, as five parts by weight of the former to eight of the latter are almost the exact proportions. The compound contains $19\frac{1}{3}$ per cent of chlorine. The mixture of concentrated nitric and hydrochloric acids is always attended with heat and effervescence, and great care should be taken to preserve the nitro-muriatic acid thus formed in strong vessels, and in a cold place. The chlorine and nitrous acid have a much weaker affinity for water than either of the acids used in the preparations, and accidents often happen from inattention to this circumstance. Dr Duncan recommends the immediate dilution of the mixture with an equal quantity of water. For all practical purposes, it is more convenient to use good ordinary acids of commerce. The decomposition then takes place slowly, in the course of a day or two, and the resulting solution of chlorine, is strong

enough to dissolve the precious metals, and may be kept with perfect safety.

In making the above calculations, I have used the corrected table of the strength of hydrochloric acid, given by Dr Ure in the last edition of his Dictionary of Chemistry. As it differs considerably from the table contained in his former editions, which has been adopted as the standard in all the best treatises on chemistry, I subjoin the abridgment of it given by Dr Duncan, in the twelfth edition of the New Edinburgh Dispensatory.

Table of the Quantity of Acid, and Quantity of Muriatic Acid Gas, and of Chlorine in 100 parts of Liquid Muriatic Acid, of different densities, abridged from Dr Ure.

Sp. Gr.	Liquid Acid.	Acid Gas.	Chlorine.	Sp. Gr.	Liquid Acid.	Acid Gas.	Chlorine.
1.2000	100	40.777	39.675	1.1102	55	21.822	23.426
1.1910	95	38.738	37.692	1.1000	50	20.398	19.837
1.1822	90	36.700	35.707	1.0899	45	18.348	17.854
1.1721	85	34.660	33.724	1.0798	40	16.810	15.870
1.1701	84	34.252	33.328	1.0697	35	14.271	13.897
1.1620	80	32.621	31.746	1.0597	30	12.233	11.903
1.1599	79	32.213	31.343	1.0497	25	10.194	9.919
1.1515	75	30.582	29.757	1.0397	20	8.155	7.935
1.1410	70	28.544	27.772	1.0298	15	6.116	5.951
1.1308	65	26.504	25.789	1.0200	10	4.078	3.968
1.1206	60	24.466	23.805	1.0100	5	2.039	1.984

ARTICLE XLV.—*Pharmaceutical Notices, No. 2.*

I was much gratified to observe in your last number a recommendation to apothecaries to keep notes of all the operations in their shops, and fully agree with the author in believing that experiments and observations such as he suggests are, without doubt, the only mode of obtaining correct practical information, and in accordance with your wish

that they may be continued, I send a few that I have made from time to time, which, if you deem of sufficient importance to publish, are at your service.

Pills of Powdered Cubebs.—Received a prescription to-day which directed powdered cubebs to be made into pills of the usual size with balsam copaiva; finding it impracticable to make them as directed, tried several of the articles used for making pills, but found none to answer so well as soap;—in the proportion of ℥j of soap to ℥ij of powdered cubebs, with a drop or two of water, a very good mass may be formed. When powdered cubebs and balsam copaiva are wanted in pills together, I find the consolidated copaiva, hard enough to powder, answers better than the fluid, although either may be made into pills with cubebs by using soap.

Pills of Camphor and Opium.—When this compound is wanted, the apothecary is generally directed to use a sufficient quantity of syrup to form a mass. I have found it impracticable to form a mass without making the pills very large, until I used soap;—with a small quantity of it a mass may be formed without difficulty.

Ointment of Hydriodate of Potassa.—I have observed that this ointment, made in the proportion of ℥ss of the salt to ℥j of ung. simp. almost invariably changes from white to yellow, and afterwards to a dark red, when it has stood for a day or two. I cannot account for this, except it may be that the hydriodic acid is decomposed and iodine formed.

Mixture of Epsom Salts, Magnesia, &c.—To-day, the following mixture was returned, which, when it was put up two days since, was in a perfectly fluid state, but now is almost consolidated. It is this

Sulph. Magnes.	℥j
Magnes Ust.	℥iij
Tr. Colchici Rad.	℥iij
Syr. Scillar.	℥ss
Aqua Cinnam.	℥iij
Aqua Communis	℥iv

Recollecting perfectly well, that it was put up according to the directions, and that it was comparatively a thin liquid, when taken from the store, I was not a little surprised to see almost a perfect solid, and certainly at a loss to account for the singular change. Fearing that possibly something might have been omitted, I made it again, and again the next day it was returned in the same condition. I have since prepared it a third time, and find it undergoes the change in from 36 to 48 hours. The cause of this strange metamorphosis I cannot explain, but probably the experiments I am about trying may throw some light upon it; if they should, I shall not fail to communicate them; notwithstanding, I hope others may not be deterred from giving their opinion upon it.

Balsam Copaiva and Castor Oil Mixtures.—I have often found difficulty, and no doubt others have also, in preparing these mixtures. It seems to arise altogether in not paying proper attention to the thickness of the mucilage, previous to adding the articles. As a general rule, the mucilage should be made about the thickness of the substances we wish to suspend; for if it be too thick or too thin, a handsome mixture cannot be made, whatever quantity of gum may be used. Two drachms of gum arabic will be found sufficient to suspend an ounce of either B. copaiva or castor oil in 8 oz. or even a pint of water, without being liable to separate, provided it is made into a perfect mucilage, with not more than half an oz. of water, previous to adding the articles.

Tincture of Kino.—It is remarked by the writer in your last number, that his tincture of kino uniformly becomes gelatinous. I have some which was made with 3 oz. of kino to 1½ pints *diluted* alcohol which has stood six months, that has not become so, and, moreover, has not lost its astringency. The kino it was made from, is in dark brown masses, mixed with sticks and leaves. It fractures very readily—the pieces or splinters not transparent, but ruby red at the extreme edges—taste astringent and bitter, leaving a sensation of sweetness in the mouth, adhering to the teeth *only* when long chewed, and colouring the saliva very slightly. From

Duncan's description, I should judge this to be the produce of the *Eucalyptera Resinifera* or brown gum tree of New South Wales. It is obtained, it is stated, by allowing the juice, which either flows from it spontaneously, or is procured by wounding the tree, to harden in the sun, while that which your correspondent used is the *extract* of the *Coccoloba Uvifera*, or sea-side grape, and this may probably account for the difference.

I beg leave to suggest, that those who may take notes may be particular to state the strength of the alcohol used, if for tincture,—the weight or proportions of the articles, and other minutiae in relation to compounds, for much will depend upon this.

Yours respectfully,

AN APOTHECARY.

ARTICLE XLVI.—*On the Sap of the Siphonia Cahucku.*

Caoutchouc is the product of several trees belonging to tropical climates, but all that met with in commerce is afforded by the inspissated sap of a large tree, growing in the warmest parts of Central and South America. This tree belongs to the natural family of the *Euphorbiaceae*, and to the class *Monoecia*, order *Monadelphia*, of the Linnean system.

From the great analogy existing between the seeds of this tree and those of the genus *Iatropa*, the younger Linnæus, who had not an opportunity of examining its flowers, placed it there, and called it *Iatropa elastica*; but Aublet, in his travels through Guiana, investigated the flowers and corrected the mistake of his predecessor, by establishing for this tree the new genus *Havea*, with the specific name *guyanensis*. Schreber, Willdenow, and Persoon, have since de-

scribed it under the generic name of *Siphonia*, which has, generally, prevailed. There is but one species of this genus as yet described, which Schreber and Willdenow have called *Siphonia cahuchu*, and Persoon, *S. elastica*.

I might have avoided entering into these botanical details, were it not for the errors which I see repeated in classical works of recent date, in which these synonyms are applied to many individuals, whilst in fact they all belong to the same.

The sap of the caoutchouc tree, which I now submit to the examination of the members of the College, belongs, indubitably, to the *Siphonia cahuchu*, as the gentleman from whom I received it recognized it, without hesitation, in Lamark's illustrations, plate 790, which I have in my possession. This sap was brought in a common porter bottle from the province of Nicaragua, in Central America.

From a conversation with that gentleman, I am inclined to believe that, in the fertile and very hot region of our continent just mentioned, the *Siphonia cahuchu* attains a higher degree of perfection than it does, generally, in Guiana and Brazil. He represents this tree as one of the most common and largest of the forest trees, and capable of affording from one hundred to one hundred and fifty pounds of gum elastic. Of the three bottles of sap which he procured, only one arrived in safety,—two burst by the fermentation of the sap during the passage, the other was preserved from destruction, by occasionally removing the cork. The capacity of the bottle was about twenty-four fluid ounces. On examination of its contents, I found them composed of three different parts; a watery liquor, of a muddy brown colour, deposited under a thick layer of a white and cream-like liquid, constituting about one-fourth of the whole fluid; the third part was an amorphous and white mass of caoutchouc, floating in it, furnished, undoubtedly, at the expense of the creamy part.

As I was desirous to keep this sap as a specimen for the cabinet of the College, I limited my experiments on it to a

few observations. When the bottle that contained it was broken, in order to transfer it, together with the mass of caoutchouc already formed, into a wide mouth bottle of white glass, the liquid part measured fourteen ounces, and the solid mass weighed nine ounces and three drachms. All the liquid part became homogeneous by transfusion, and of a dirty white colour; its smell was not very unpleasant, and its taste was bitter and nauseous; it turned litmus paper of a deep red. Four drachms of it, gently evaporated, produced forty grains of dry gum elastic, slightly contaminated with the other principles contained in the sap. The mixture of the two liquids remained for some time perfect, but, at last, the creamy part separated and rose to the top. The mass of caoutchouc was white, amorphous, and of a specific gravity less than the watery liquid. Whether this mass was formed by the action of the air, or independently of it, is a question which I am not enabled to answer in a positive manner. From the inquiries I made on the subject, the gentleman who brought it, assured me that the bottle remained constantly corked, except in a few instances, when he took out the stopper to let the gas generated by fermentation escape. A note to the article caoutchouc, in the *Dictionnaire des Drogues*, mentions, that this substance had formed spontaneously without the contact of air, in bottles of sap sent to Europe. The white colour of the caoutchouc, thus produced, passes to brown on exposure to the atmosphere.

In order to give more interest to this communication, I will reproduce here an article on the sap of the caoutchouc tree, with an analysis of it, published by Mr Faraday, in the *London Journal of Science*, and republished in the first series of the *Journal of our College*, page 63. There is, however, some difference between his description and that of the sample presented to you. I think the latter much richer in gum elastic than that analyzed by Mr Faraday, as, instead of containing less than one-third its weight of caoutchouc, the present sap contains very nearly one-half.

Mr Faraday found the sap of the caoutchouc tree* to contain, in one thousand parts,

Pure caoutchouc,	317.
Albuminous precipitate,	19.
Peculiar bitter colouring matter, a highly azotic substance, and wax,	71.3
Substance soluble in water, not in alcohol,	29.
Water, acid, &c.	563.7

1000

The fluid was a pale yellow, thick, creamy-looking substance, of a uniform consistency. It had a disagreeable acedent odour, somewhat resembling that of putrescent milk; specific gravity 1.01174. Exposed to the air in thin films, it soon dried, losing weight, and leaving caoutchouc of the usual appearance and colour. It was coagulated by heat and alcohol.

By mixing the sap with water, no other change took place than mere dilution. When the pure or diluted sap was suffered to remain at rest, a separation took place; the opaque portion contracted upwards, leaving beneath a deep brown transparent solution. By repeated washing in water, the caoutchouc was obtained pure, without any alteration in its original state. When thus obtained, it is a soft white opaque mass, which becomes, when perfectly dried, transparent and colourless, resembling exactly a piece of clear strong jelly. It has a very adhesive surface, which it retains after many months exposure to air. Its fresh cut surfaces, pressed together, also adhere with a force equal to that of any other part of the piece. A strip of it, boiled in a solution of potass so strong as to be solid when cold, was not at all affected by it, except that its surface assumed a pearly appearance; no softening, above what would have been produced by water, occurred. It consists of 6.812, or nearly

* Mr Faraday does not mention whether the sap analyzed by him belonged to the *Siphonia*, or to another tree.

eight portionals of carbon, and 1,000, or seven portionals of hydrogen.

No means which have yet been discovered seem competent, when the caoutchouc has once been aggregated, to restore it to its pristine state. Previous to its aggregation it may be either scented or coloured. A solution of camphor in alcohol was added to water, so as to precipitate the camphor in a flocculent state; a little of this was added to some of the pure caoutchouc in water, well agitated, and then coagulated; the caoutchouc obtained was highly odorous.

In the trials made to give it colour, the body colours were found to answer best. Indigo, cinnabar, chrome yellow, carmine, &c. were rubbed very fine with water, and mixed well with pure caoutchouc; the solution was then coagulated, and perfectly coloured specimens were obtained.

A portion of well-washed milky caoutchouc being added to olive oil, and the two beaten well together, a singularly adhesive stringy substance was produced, which, retaining the water diffused through it, assumed a very pearly aspect, stiffened, and was almost solid; upon being heated so as to drive off the water, it became oily, fluid and clear, and was then a solution of caoutchouc in fixed oil. On adding water, and stirring considerably, it became adhesive as before.

Oil of turpentine was imperfectly miscible with it.

Cadet de Gassicourt, in his *Formulaire Magistral*, and Swediaur in his *Pharmacopœia Medici Practici Universalis*, give the following formula for a *caoutchouc plaster*.

R.—Caoutchouc, 2 parts,
Essence of turpentine, 8 parts,

digest for eight days, at a moderate heat, in a close vessel, then boil on a gentle fire. When the mixture has settled, decant and add

Olive oil, }
White wax, } ana 1 part;

boil gently until the spirit of turpentine is evaporated, and keep the mass when cold.

This plaster is spread on linen, and used as adhesive plaster.

ARTICLE XLVII.—*Observations on certain preparations in the Pharmacopœia of the United States. By George B. Wood, M.D., Professor of Materia Medica and Pharmacy in the Philadelphia College of Pharmacy.*

[Continued from page 209.]

Quinia Sulphas Impurus.

The liquor which remains after the crystallization of the sulphate of quinia, in the process for obtaining that salt, is rich in the active principles of Peruvian bark, and when evaporated, leaves a dark coloured mass of the appearance of a vegetable extract. This substance, having been ascertained by abundant experience to be a very efficient medicine, has been introduced into the late edition of the Pharmacopœia, under the title of "Impure Sulphate of Quinia." The name by which it was first brought into notice, and continued to be known in this city, was "Extract of Quinine"—a term obviously inaccurate in itself, and altogether inapplicable in the present case. Speaking in correct pharmacæutic phraseology, there can be no extract of a pure proximate principle. The name adopted by the revisers of the Pharmacopœia is justified by the chemical composition of the substance to which it is applied. It may be remembered by those who read the medical journals, that about two years since, the discovery of one or more new organic alkalies in Peruvian bark was announced by Sertuerner. These were said to have been detected in the residuary mass which forms the subject of the present notice. But MM. Henry and Delondre of Paris, having soon afterwards submitted this matter to chemical examination, ascertained that it contained no new alkaline principle, and that what had been mistaken for such by Sertuerner was, in fact, a mixture of Quinia and Cinchonia with a peculiar yellowish substance of very difficult separation. The alkalies no doubt exist in it, combined with sulphuric acid, probably in excess, and no

better officinal title could be adopted than that of the Pharmacopœia.

The propriety of introducing the Impure Sulphate of Quinia among the officinal preparations, will be obvious to those who are acquainted with its powers, and consider how large a proportion of a costly medicine would be wholly lost by its rejection. The sources of Calisaya bark, from which alone Quinia is now procured, are by no means inexhaustible, and should be husbanded with all possible care. To throw away any portion of it which possesses the peculiar medicinal properties of the drug, would be inexcusable waste. Besides, by increasing the efficient product from a given portion of the bark, we enable the manufacturer to afford it at a cheaper rate, and thus immediately benefit the community. I have been informed by a chemical manufacturer, that he had on hand a large quantity of the residuary matter left after the crystallization of Sulphate of Quinia, for which he could not find a market. By the sale of this, it is evident that he would be able to lower the price of the pure sulphate, without diminishing his own profits. That the medicine under consideration is really efficient can at present scarcely admit of a doubt. It was first prescribed about eight years since by the late Dr Emlen, at the suggestion of Mr John Farr, chemical manufacturer of this city, by whom a short paper in relation to it was communicated to the College of Pharmacy, and published in the first series of this Journal, page 43, in May 1826. By Dr Emlen it was found in twice the quantity to be equally efficient with the sulphate of quinia. The author of these observations has habitually employed it, for seven or eight years, in the treatment of intermittent fevers, and with almost uniform success. In the very few cases in which he has failed with it, he has found the pure sulphate equally ineffectual. It has recently attracted attention in Europe; and superiority has even been claimed for it over the latter preparation. There is probably little difference between them except in the dose.

The Impure Sulphate of Quinia is of a dark colour, almost black, and when perfectly dry, is hard and brittle, and breaks

with a shining resinous fracture. It is not soluble in water, but may be suspended in that fluid by the intervention of mucilage, and is sometimes given in the form of emulsion. It is directed in the Pharmacopœia in the shape of pills, each of which contains two grains, equivalent to one grain of the pure sulphate. From twelve to eighteen of these may be given between the paroxysms of an intermittent, and repeated during each successive interval till the cure is completed. It seldom happens that a third paroxysm occurs after their use has been commenced.

As the preparation might be readily adulterated, and in such a manner as to render detection difficult, it is important that the apothecary, if he do not himself prepare the article, should procure it from a source upon which he can implicitly rely.

Syrupus Rhei Aromaticus.

The process for Aromatic Syrup of Rhubarb, given in the first edition of the Pharmacopœia, has several defects, some of which are radical. Thus the aqueous infusion of the rhubarb and aromatics is directed to be evaporated one half. It is now well known that the purgative principle of rhubarb is either volatilized at the temperature of boiling water, or undergoes some chemical change which diminishes its efficiency. The volatile oils, also, to which the aromatics owe their virtues, rise with the vapour of the water, and the consequence is, that notwithstanding the enormous disproportion of spices added, the resulting preparation is very weak in aromatic properties. It is obvious to one who examines the formula, that the syrup can hold at most but about one third the quantity of the aromatic oils which an equal measure of water might dissolve. The rhubarb and the spices are therefore both in some measure wasted in the process, and the objects proposed by the formula are not fully attained. But if these valuable ingredients are deficient, one is subsequently added to which the same remark will certainly not apply. After the completion of the process, a proportion of Diluted

Alcohol is mixed with the ingredients of the syrup, equal to about one third of the whole quantity, and no more heat directed than what may be sufficient to dissolve the sugar so as to form a syrup. Now the use of alcohol in liquid preparations, is either to extract principles which water is incapable of dissolving, or to enable the active matter to resist decomposition from the influence of the air, or from the mutual reaction of its own ingredients. In the present instance it serves neither of these purposes, as it is added after the infusion has been prepared and strained; and the sugar in syrups should be sufficient for their preservation. The only effect, therefore, of the alcohol, is to render the syrup more stimulating. The Aromatic Syrup of Rhubarb is usually prescribed to infants labouring under cholera or diarrhœa, in the quantity of a teaspoonful every two hours, till it produces some operation of the bowels; and it not unfrequently happens that half a fluid ounce is given in the course of a day. Now it will appear upon calculation that the proportion of alcohol in this quantity, for a child one year old, would be equivalent to at least two-thirds of a wineglassful of brandy to an adult. This might not be improper in persons habituated to the use of alcoholic drinks; but in an infant, with the susceptibilities of its system as nature gave them, it would be utterly inadmissible, especially in a complaint attended, as the infantile cholera frequently is, with an inflamed condition of the lining membrane of the stomach and bowels. It is not too much to say that death might result from the continued use of such a preparation, even in cases which call for the employment of an aromatic syrup of rhubarb.

Let us examine the new process, and ascertain how far it is free from the defects just noticed in the old. The directions are to macerate the rhubarb and aromatics in Diluted Alcohol for fourteen days, then to strain, and by means of a water bath, evaporate the tincture one half; and lastly, to mix the liquors while still hot with syrup previously heated. By the use of Diluted Alcohol in the first step of the process, the virtues of the aromatics are more completely extracted, and

consequently a smaller proportion is requisite than in the former process, by which an enormous waste of valuable spices was incurred. The seven pints of syrup which result from the new process, are more strongly impregnated with the aromatic properties than a pint and a half of the old, though the quantity of spices employed is equal in both.

Were it not for the injurious influence of the alcohol upon the infantile system, it would be proper to complete the process by incorporating the tincture immediately with a due proportion of simple syrup, as recommended in Mr Durand's formula. (See Vol. II. p. 218 of this Journal). But an important object is, to obtain the virtues of the rhubarb and aromatics free from alcohol. For this purpose, it is necessary that the tincture should be evaporated; and to avoid the chance of too elevated a temperature, the water bath is directed. The heat requisite for the evaporation of alcohol is insufficient to drive off any considerable quantity of the essential oils, or the active principle of the rhubarb; and by arresting the process at the point at which the spirituous portion of the tincture has escaped, we gain the two objects of retaining the medicinal properties of the preparation, whilst we free it from the deleterious presence of the alcohol. The process of the Pharmacopæia meets these objects precisely.

The only other point of inquiry is, whether the proportion of rhubarb, in the syrup, is sufficient to answer the purposes for which the preparation is intended. The proportion of rhubarb actually employed is almost precisely the same in the two processes—nearly eleven grains to the fluid ounce: but as less of its activity is lost by the new than the old, the former must be considered as affording the stronger syrup. If the syrup is prepared exactly according to the new process, and the rhubarb employed is of good quality, one fluid ounce should be sufficient to produce in the greater number of cases a slight laxative effect upon an adult. This is all that is to be expected from it in such cases. The prepara-

tion was not intended as an active cathartic, but as an agreeable tonic cordial laxative, having somewhat of an astringent effect, in cases of looseness of the bowels with irritable stomach; and its application in regular practice is chiefly confined to infantile cases of bowel complaint. The dose in which it is given to children from one to two years old, is a fluidrachm, repeated at short intervals, till it operates. In this quantity is the strength of between one and two grains of rhubarb, which is quite as much as the cases in which it is usually given require or would admit.

And here I would respectfully protest against the practice, to which I have been informed that some apothecaries are addicted, of using inferior drugs in the formation of their tinctures, syrups, and other liquid preparations. Efficiency is as desirable in these, as in the medicine in substance; and the greater difficulty of detecting any defect, is certainly no argument in favour of the practice. It may be said, that inferiority in the character of the drug might be compensated by the use of a larger quantity; and admitting that the precise degree of relative strength were known, this might be a good argument: but such is not, and cannot be, the case; and the apothecary, therefore, who thus employs an inferior article in increased quantity, though he may produce a strong preparation, cannot be certain that he has attained the exact degree of strength indicated by the Pharmacopœia. His preparations may in fact be too strong, and as much evil, to say the least, is likely to result from such a cause, as from an undue want of strength. The correct course is always to employ efficient drugs, and to adhere rigidly to the officinal directions, unless these have been shown to be defective.

Syrupus Sarsaparilla.

It may now be considered a well established fact, that the virtues of sarsaparilla are diminished, if not destroyed, by long continued decoction. The practice of long boiling, so

universally adopted in making the liquid preparations of this root, appears to have originated in the notion that its activity resided in its mucilaginous or amylaceous matter, which can be thoroughly extracted only by this method. The active principle is now believed to be an acrid substance, existing chiefly in the cortical portion, and yielded readily to water or alcohol by maceration, even at common temperatures. In correspondence with our improved knowledge in relation to the proper method of treating sarsaparilla, it became necessary to alter the former processes, and adopt a plan by which the virtue of the medicine might be extracted, and obtained in a concentrated form, without the application of a boiling heat. The formula published by William Hodgson, Jun. in this Journal, Vol. II. p. 284, appeared to meet the desired object, and was adopted as the basis of the new officinal process. A momentary glance at its provisions will serve to exhibit its great superiority over that contained in the first edition of the Pharmacopœia. The virtues of the sarsaparilla and other solid ingredients, are extracted by maceration in diluted alcohol, without heat, and the resulting tincture evaporated, by means of a water bath, so as to drive off the alcohol. In this way, the starch, which is wholly inactive as a medicine, and served only to produce, in the liquid preparation which may contain it, a disposition to decomposition, is left behind; and the temperature requisite to evaporate the alcohol is insufficient to dissipate the active principle of the sarsaparilla. The remaining steps consist merely in forming a syrup with sugar, and in adding certain essential oils to improve the flavour. The substitution of the essential oils for the aromatics themselves previously employed, is also an improvement, as, by the long boiling to which these were formerly subjected, their strength was more or less dissipated, and the proportion remaining in the preparation altogether uncertain. Another advantage of the new process is, that all the directions are precise; and the proportion of the ingredients, to the amount of the re-

sulting syrup, is quite definite. The former directions were, after the addition of the honey and sugar, to boil so as to form a thick syrup. It is obvious, that under these directions, precisely the same result would not be obtained by different operators. The superiority of the syrup prepared according to the new process, is evinced by its possession, to a much greater extent, of the peculiar acrid taste of good sarsaparilla.

(To be continued.)

SELECTED ARTICLES.

ARTICLE XLVIII.—*On the Extraction of the Alkaloids of Peruvian Bark.* By MM. Henry, Jun. and Plisson.

The extraction of the alkaloids of Peruvian Bark (quinine and cinchonine) without the employment of alcohol, was a problem which it was very important to solve, as regards economy and labour; hence it is not astonishing that it has attracted the attention of a great number of chemists, and a variety of processes have already been given to the world by MM. Guerette, Guillebert, Cassola and ourselves, but it must be allowed, that no one has yet solved the problem satisfactorily, all having presented imperfect methods, either as regarded their execution or their products.

For more than a year past, we have been occupied on this subject, and the multiplied and diversified experiments it has suggested to us, have led us to some curious results, although our object has not been entirely attained. It was in fact these investigations which led us to our researches on the state of the alkaloids in the Peruvian barks, as well as to the examination of the kinic acid and its saline combinations. Not having completely succeeded in our first trials, we gave the thing up, when the thesis of M. Buisson appeared, and gave us an account of two experiments on the same subject. These having some analogy with some of those we tried, we think it right to publish one, which afforded us nearly the same results, with a few observations arising from it.

Having ascertained, in our researches, that the alkaloids are found in the Peruvian barks and their decoctions in a state of combination, both with the kinic acid and the cinchonic red, a composite substance, which we shall term for perspicuity *quino-colorantate*, and that the two bodies differed much as to their solubility in water, the first being very soluble, the other scarcely so, we have endeavoured to obtain the alkaloid from each of these two combinations, by the following mode:

After having made the muriatic decoctions of the yellow bark, as in the common plan of preparing the sulphate of quinine, they were strained, and whilst they were warm, lime water filtered through a hair sieve was added to them, until the supernatant fluid gave an indication of acidity, and was partly decoloured; it was then decanted, and a few drops of acetate of lead sufficed to remove the whole colour. The precipitate was united to the *colorantate* of which we are about to speak.

The solution precipitated the quinine, either by a slight excess of ammonia, or by very clean lime water; this quinine, well washed, was added to that of the other treatment. In the above operation, the quinine united to the kinic acid, or a portion of the muriatic, remains in solution, during the partial saturation with the lime, whilst the *quino-colorantate* was precipitated, when there remained too little acid to keep it dissolved. It then formed with the excess of the cinchonic red, an abundant orange red precipitate, as if hydrated; this precipitate should be twice treated with a solution of acetate of lead in water by a gentle heat (one killogramme of bark requires 125 to 150 grammes of the crystallized acetate of lead); the liquid being still acid*, and containing a slight excess of lead, it is to be strained under pressure till it assumes the colour of wine lees; the excess of lead in the strained fluids is to be removed by sulphate of soda, and the quinine

* We have also succeeded in boiling it with the subacetate of lead, without the fluid being acid.

afterwards precipitated as before, by means of lime water or ammonia, and added to that of the first process.

This mixture, carefully sulphated and treated with charcoal, gives, after being purified, a very white, bitter, silky salt, soluble in alcohol, &c.

It is evident, that the *colorantate* may be compared to a true saline combination, in which the cinchonic red acts like a true acid, and in uniting itself to the oxide of lead, permits the formation of a soluble acetate of quinine, and a *colorantate* of lead. This effect is also produced, as we have ascertained, with many other salts, as the hydro-sulphate of lead, the sulphate of lime itself, the moist oxido-chloride of antimony, the sulphate of alumine and potass, the chlorides of tin, antimony, &c. But, with all these bodies, a portion of the alkaloid disappears, for we have never been able to obtain more than four-fifths or five-sixths of the quantity furnished by the comparative trial by alcohol in the common way. At the same time, only traces of quinine are to be detected in the residues, by means of alcohol, and this of a green colour and accompanied with matters, which perhaps arise from its alteration, or embarrass the extraction. We have been led to this opinion, by ascertaining that when an equal weight of sulphate of quinine is decomposed by lime, ammonia, or hydrate of lead, that alcohol will always furnish a diminished quantity of quinine.

The alkaloid must therefore either be modified, or form some unknown triple combination.—*Jour. de Pharm.* April 1831.

ARTICLE XLIX.—*Phenomena presented by Acetate of Lead, when exposed to the action of heat, and the products thus obtained. By C. Matteucci.*

Common acetate of lead exposed to a gentle heat begins to melt at $57^{\circ}.5$; the liquid mass enters into ebullition at 100° , and afterwards assumes the form of a very white solid mass at about the same temperature. During this first fusion, the acetate of lead only loses the three proportions of water it contained. When submitted to a higher temperature than that in which it assumed the solid form, it experiences a second fusion, and at 280° becomes completely fluid. It remains so for some time, and after having assumed a brownish colour, it again congeals and presents a dirty white mass, without any appearance of crystallization; this is the tri-acetate. During the operation nothing but acetic acid and a small quantity of pyro-acetic spirit are disengaged; afterwards nothing is given off but this latter product, mixed with much carbonic acid.

The analysis which was made of it by preparing its vapour over oxide of copper gave

Hydrogen	6,4039 = 3 volumes 12
Carbon	59,8600 = 5 " 20
Oxygen	33,7361 = 1 " 4

This composition of the pyro-acetic spirit may be represented by one proportion of acetic acid and one of water, and by a product formed of six proportions of carbon and two of hydrogen. The pyro-acetic spirit, when permitted to stand, soon decomposes; a few minutes exposure to the air is often sufficient to render it acid and milky, and acetic acid and a substance of an oleaginous appearance are produced. When heated and placed in contact with potash or lime, it decomposes, and acetates of these bases and the oleaginous substance are obtained. One or two decigrammes placed in contact with chloride gas, in a common bottle, soon became turbid; but in less than twelve hours, whether exposed to the

light or in the dark, the fluid becomes limpid, and a greenish oleaginous substance is visible on its surface, which becomes almost solid on the addition of cold water. The liquid is extremely acid, and the chlorine is changed into hydrochloric acid.

The oleaginous substance has a very aromatic smell, and on an exposure of a few days to the air, it assumes a beautiful green colour; it is insoluble in water, but dissolves in alcohol. When burnt in a glass tube, the existence of the chlorine is not recognizable in the products. It appears to be a combination of hydrogen and carbon, analogous to naphthaline or the sweet oil of wine.

The liquid acid from which the oleaginous substance had been separated, was a mixture of hydrochloric and acetic acids. When a smaller proportion of chlorine is employed, the oleaginous matter is not formed, but a substance crystallized in very fine needles makes its appearance.

If the pyro-acetic spirit be poured on a small quantity of potassium in a glass tube, a most violent action ensues, much heat is evolved, and the fluid thickens in assuming a yellow brown colour. A few moments afterwards, an oleaginous substance collects on the surface, of a beautiful green colour, and an odour analogous to that of mint; it is certainly identical with that obtained by means of chlorine. The fluid from which it had separated, contained acetate of potassa.—*Annales de Chimie, April 1832.*

ARTICLE L.—*Process for preparing extemporaneously the Medicinal Prussic Acid.* By Thomas Clark.

The preparation of prussic acid, according to the processes as yet devised, being attended with too much trouble and inconvenience to be resorted to by pharmacutists, this article

has fallen almost exclusively into the hands of the chemical manufacturer. It is in order to give to all the opportunity of preparing for themselves, with facility and at a trifling cost, a prussic acid of an uniform strength, that I venture to publish the following formula :

Tartaric acid	72	grs (French)	63	grs (Amer.)
Cyanide of potassium	32	do. do.	28	do. do.
Distilled water	3j	do. do.	3j	do. do.

Dissolve the tartaric acid in the distilled water, in a proper sized phial, provided with a good stopper; then add the cyanide of potassium, apply the stopper, and secure it with the finger; agitate and keep the phial in cold water, in order to counteract the heat evolved during the operation. When the reaction has taken place, set the phial in a dark and cool place for twelve hours, to permit the cream of tartar which has formed to precipitate; then decant the liquor and keep it in a proper place. Persons familiar with chemical calculations will perceive at once that the result of this decomposition is as follows :

The quantity of tartaric acid employed is	72	grs (French)	63	grs (Amer.)
That of cyanide of potassium	-	32 " "	28 " "	
		<hr/> 104	<hr/> 91	
They produce cream of tartar	-	91 " "	79 $\frac{2}{3}$ " "	
And hydrocyanic acid	-	13 " "	11 $\frac{1}{3}$ " "	
		<hr/> 104	<hr/> 91	

But one ounce of water dissolves only 5 grains ($4\frac{1}{3}$ grains American) of cream of tartar, and its solvent power is probably diminished by the presence of the hydrocyanic acid. Therefore all the cream of tartar formed in the operation, with exception of 5 grains ($4\frac{1}{3}$ grains), precipitates, and the water retains in solution, besides the small quantity of cream

of tartar, 13 grains (11½ grains American) of hydrocyanic acid.

This solution forms twenty-six doses, each half a grain (French) of hydrocyanic acid; each dose contains consequently only one-fifth grain of bitartrate of potassa. By a chemist, this trifling quantity would be considered as an impure product which would require distillation; but to a practitioner, whose object is different, and who requires only a preparation of uniform strength, it will be a matter of no consequence.

By this process and using the above mentioned quantities of tartaric acid and cyanide of potassium, it is evident that by varying the proportion of water, prussic acid may be obtained of various strengths. The above formula corresponds with the strength of Vauquelin's prussic acid; that is, one ounce of water contains the quantity of prussic acid that one drachm of cyanide of mercury will yield, but this quantity is furnished by 32 grains French (28 grains American) of cyanide of potassium. This is the strength most commonly used; it has been adopted in the last editions of the Dublin and United States Pharmacopœias. Magendie's solution is four times as strong.

As the great difficulty in this operation is to procure the cyanide of potassium, I will describe an easy process for obtaining it from the ferro-cyanate of potassa, the object of which is to deprive this salt of its water of crystallization and from the iron it contains, and thus to obtain a pure cyanide of potassa. For this purpose, the salt is first coarsely pulverized and then dried by a gentle heat. As the ferro-cyanate of potassa is hard and very difficult to reduce to powder, when you have to operate on a large quantity, it is sufficient to bruise it, and expose it to a gentle heat, after which you may make it finer, dry again and gradually deprive it of all its water of crystallization, without being obliged to submit it to such a degree of heat as might prematurely decompose it. From one ounce you obtain seven drachms of a fine white powder.

The cyanide of iron is entirely decomposed by heat, but the cyanide of potassium is not, at least in close vessels ; but when this salt is highly heated in contact with air or steam, it may likewise undergo decomposition. The dry powder is therefore introduced into a sheet iron bottle, provided with an iron tube screwed to the bottle, which tube is to be bent a few inches from the bottle so as to collect the gas; the other end to be plunged under water. The bottle thus prepared is placed upon a lively fire until the disengagement of gas is all over. The cyanide of potassium remains in the bottom, together with iron and charcoal, from the decomposition of the cyanide of iron.

The cyanide of potassium is dissolved in water, filtered, evaporated and set to crystallize. The mother-water is again to be concentrated, and the operation is continued till all the cyanide of potassium is obtained. This salt requires to be dried at a moderate heat and kept in close vessels.

When the cyanide of iron is not entirely decomposed, the ferro-cyanate of potassa crystallizes first. These crystals, which are easily recognized by their form and yellow colour, must be rejected.—*Journ. de Chimie Medicale, Sept. 1831.*

E. D.

ARTICLE LI.—On Borotartrate of Potassa.

The singular property which boracic acid possesses of combining with the bitartrate of potassa, and forming an extremely soluble compound with it, has been long known in Europe. The soluble cream of tartar has even been introduced into medical practice, and admitted to a place in the foreign Pharmacopœias. In the earlier volumes of the *Journal de Pharmacie*, are several memoirs upon this subject, the most elaborate of which is by M. Vogel, in the third volume of that excellent journal.

He directs us to boil six pounds of cream of tartar and two pounds of borax with sixteen pounds of water, and decant the clear liquid when cold. By evaporating this to dryness, seven pounds of soluble cream of tartar will be obtained. The loss of one pound is chiefly due to the water of crystallization contained in the borax. The resulting salt is deliquescent, soluble in 75 per cent of cold water, and in less than half its weight of boiling water. It contains the whole of the tartrate of lime of the cream of tartar, which gives its concentrated solution a gelatinous aspect. The mineral acids decompose it very imperfectly, and tartaric acid has no action on it. When it is calcined to a red heat in a platinum crucible it is decomposed, and leaves borate of lime, borate of soda, and carbonate of potassa. The other alkaline borates form similar combinations with the alkaline bitartrates. The theory of this singular compound has always been obscure. While borax was supposed to be a sub-salt, with an excess of alkali, it might have been supposed that the excess of acid in the cream of tartar combined with the excess of alkali in the borax, and thus formed a quadruple salt. This theory, however, will not explain the action of boracic acid on the bitartrate; and it is known, moreover, that both the salts employed are bi-salts. The following luminous and interesting views of this combination are contained in the third volume of Berzelius's Chemistry, and furnish, without doubt, the true theory respecting it.

“During a long time we did not know how to regard the composition of this salt. It did not appear probable, that in a salt, the base of which is already super-saturated with acid, another and a weaker acid could divide this base with the stronger one, although this is the opinion which was first suggested. It has since been found, that boracic acid, like a great number of the weak metallic acids, has the property of combining with stronger acids as a salifiable base, whence it follows that this salt is a double salt, composed of tartrate of potassa and tartrate of boracic acid, or in the more concise language of Berzelius, of potassic tartrate and boric

acid tartrate. According to an analysis of Souberain, the composition of this salt is such, that the potassa and boracic acid contain equal quantities of oxygen. But these proportions do not agree with the quantities employed in the preparation of the salt. It is probable that the bitartrate of potassa combines with the boracic acid in several proportions, and that the oxygen of the acid may be equal to that of the potassa, or double or triple this quantity; for if it were otherwise, we could not obtain this double salt in employing proportions as variable as those indicated in the books, where we find as much as eight parts of the tartrate prescribed to one of boracic acid."

D. B. S.

ARTICLE LII.—*On Tartrite of Iron and Ammonia.* By
C. R. Aikin.

Having lately paid some attention to several of the combinations of tartaric acid with oxide of iron and alkali, I beg leave to mention one or two salts but imperfectly known, which appear to me to supply what is yet a desideratum in pharmacy—namely, a soluble salt of iron of uniform composition, not decomposable by alkalies, nor depositing oxide by keeping, and of no unpalatable taste. In a chemical point of view, too, some of these compound salts are not uninteresting.

It is well known to chemists, being, I believe, first noticed by Klaproth (Essays, vol. ii. p. 108), that the presence of a certain proportion of tartaric acid in any of the acid solutions of iron entirely prevents the precipitation of the metallic oxide by the addition of any alkali, pure or carbonated, and in any excess: so that, in fact, there is no method of extracting the oxide of iron from these compounds, except by calcining the salt in a red heat, to destroy the vegetable acid,

and then dissolving out the iron from the carbonaceous residue.

The salt which I principally wish to introduce to notice, is the tartrite of iron and ammonia, which is made by combining the proto-tartrite of iron (itself insoluble) with ammonia, which gives it solubility and all the other properties which may be required for its medicinal use.

When a bundle of fine iron-wire is digested with a warm solution of tartaric acid, hydrogen gas is soon given out; and after a while, the wire becomes coated with a gray crust of prototartrite of iron, which partially dissolves in the liquid, so long as there is much excess of acid, giving it a chalybeate taste. But as saturation advances, the crust becomes less soluble, and closely adheres to the undissolved iron, so as to make the process of saturation intolerably tedious if left to itself. A little variety of management, therefore, is required, and this may be done in two ways, as follows:

1. Put into a large iron ladle two ounces of tartaric acid, about as much clean iron filings free from brass, and four ounces of water, and heat it over a fire. Sulphuretted hydrogen gas rises immediately; the mixture soon swells, froths and thickens, with a slate-gray pasty mass, which begins to form, and the whole must be kept constantly stirred with a broad spatula from beginning to end. More water must be added, which should be no more than to prevent the materials from spirting out by the bubbles of gas, keeping the mixture thick enough to prevent the filings from sinking. In this way, when about twelve ounces of water have been expended, in half an hour the ladle will be filled with a slate-gray puffy mass, scarcely sour to the taste, which may now be emptied into an earthen mortar; and by standing a few hours in a warm place the acidity is entirely gone, and the mixture now consists of gray proto-tartrite of iron, mingled with the undissolved filings.

2. Another method, which takes longer time, but saves the wear of the iron ladle, is simply this:—Put into a large

earthen mortar any quantity of tartaric acid, with two or three times its weight of iron filings; which, indeed, is much more than is wanted to saturate the acid; but the roughness of the filings is of essential use in mechanically separating the insoluble tartrate when rubbed with the pestle, and thus presenting clean surfaces to the acid. Add hot water, just enough to dissolve the acid, and set it in a warm place to digest. As before, sulphuretted hydrogen rises, together with that black oily fetid scum which always attends the solution of iron when this gas is evolved. In an hour or two, some of the gray proto-tartrate is perceived, and the mass thickens and froths. Continue the digestion in a warm place, rubbing the materials very frequently, and adding just water enough to allow the gas to escape. In this way, with very little pains, the acid becomes saturated in about two days, all sourness disappears, and, as in the former instance, the mixture consists of the gray proto-tartrate of iron, with a large excess of undissolved filings.

Next, without drying the mixture, pour into the mortar some liquid caustic ammonia, the stronger the better, and mix with rubbing. The moment the ammonia touches the proto-tartrate it changes it to a deep olive green, and the mass, by rubbing, stiffens to the consistence of printer's ink. On further dilution with water (cold distilled), and supersaturation with the alkali, the whole dissolves into a deep bottle-green liquid, leaving little else but the untouched iron filings; which last may be washed with water, dried, and set by for future use.

The green liquid is now a strong solution of ammoniacal proto-tartrate of iron, with some excess of alkali, and its taste is saline and chalybeate, but without any astringency; and it is by the repeated evaporation and solution of this liquid that the salt is obtained which I propose for use. Put the green liquid, with the washings, into a flat porcelain dish, and evaporate, with a moderate heat, to perfect dryness, but without scorching. As the excess of ammonia flies off the liquid loses its green hue, becomes of a deep red-brown, and

yields a salt of the same colour. Redissolve this in water, with a little more ammonia, separate by subsidence and the filter a small portion of brown sediment, and once more evaporate the clear solution to perfect dryness, in a heat about equal to that of a pretty warm oven. Till absolutely dry, the salt is extremely tough and tenacious; but when no more moisture remains, it is perfectly brittle, and separates from the vessel with extreme ease.

This salt, the *tartrate of ammonia and iron*, has now the following properties: it is in very shining, glossy, brittle fragments, of so deep a red as to appear black in mass, and looking not unlike crushed garnets, but without any definable crystalline texture. When a little is spread upon paper, in half a minute many of the smaller particles begin to split and fly asunder, like recently fused glass of borax. It is not deliquescent. It dissolves with the greatest ease in water, hot or cold, and almost to any extent, forming a deep red liquid; which yields the salt again on evaporation, unchanged, and without any farther deposition of oxide, and this for any number of times. But the most remarkable change that takes place is in the taste. Before evaporation, this was simply saline and chalybeate, but now it has become so strongly saccharine as to equal that of extract of liquorice, and is so powerful when in moderate dilution, as to cover almost every other flavour. Spirit of wine coagulates a strong solution of the salt, but it becomes clear again on dilution. The watery solution pretty soon becomes mouldy when kept by itself, and then it deposits much oxide of iron; but this change may be entirely prevented by adding from a sixth to an eighth of spirit of wine. I have now kept, for a considerable time, a solution of the salt (32 grains to the fluid ounce) in a mixture of seven parts of water and one of spirit of wine, without the smallest change.

This solution, which might be adopted for medicinal use, mixes without visible decomposition with all the alkalies, pure or carbonated, and in any excess; with most of the neu-

tral salts used in medicine—sulphate of soda or of magnesia, for example; with the decoctum aloë c. and with the infusions of orangepeel, quassia, or chamomile. The fixed alkalies, however, so far decompose it as to render the ammonia sensible to the taste, but the solution retains its clearness.

With regard to the chemical composition of this salt, it is somewhat complicated, and I have not been able to analyze it fully. It is composed of tartaric acid, ammonia, protoxide and peroxide of iron, and a good deal of saccharine matter. This last is doubtless formed at the expense of part of the tartar, and perhaps by the agency of the protoxide of iron, assisted by a heat above that of boiling water. Hence it is necessary to form the sugar, that the solution should be fully dried, for the saccharine taste does not appear till then. Acetate of lead causes a copious separation of tartrate of lead, not white, as might be expected, but deeply tinged with oxide of iron, that falls with it. With regard to the state of oxidation of the iron, as it strikes an immediate black with galls, part of the metal must be peroxide, but certainly not the whole, for there is a compound of *pertartrite* of iron and ammonia, which I shall presently describe, which differs essentially from this salt, and which may be converted into it by digestion with fresh iron filings. I know of no means of estimating the relative proportions of these two oxides in a compound like this, but doubtless it is due to the presence of the saccharine matter that the salt makes no farther progress in oxidation during an indefinite number of solutions and evaporations. The mere quantity of metal is easily obtained by calcination. When the dry salt is heated with a spirit lamp on a thin platina shell, it first gives out much vapour of ammonia, with visible dark smoke; it then emits sparks till red hot, when it still retains its form, but with the loss of two-thirds of its weight, and becomes a dark glossy coal, strongly magnetic. By thus igniting 12.5 grains of the salt, I obtained, in two experiments, 4.45 of this magnetic coal, which was deflagrated with a pinch of nitre, dis-

solved in strong muriatic acid, recovered by ammonia, and gave 4.3 grains of dry red peroxide of iron. Hence we may conclude that 100 grains of the salt contain 20.08 grains of iron, which would make 30.96 of protoxide, or 34.4 of peroxide. Also, 100 parts of this salt contain as much metallic iron as 119 of crystallized sulphate of iron; and these proportions may be borne in mind in prescriptions for medicinal use.

On the average of several experiments, I find that 100 parts of crystallized acid of tartar yield from 156 to 160 of this tartrite of ammonia and iron.

It is not absolutely necessary that the ammonia be caustic in preparing this salt; the carbonate, I find, will answer very well, but it requires a longer digestion before the gray proto-tartrite will combine with sufficient ammonia to become entirely soluble. Similar triple salts might doubtless be made by saturating the proto-tartrite with potash or soda, but there is this advantage in the ammonia, that no nicety of proportion of it is required, as any excess flies off as the solution dries.

I shall now say a few words on the combination of tartaric acid with peroxide of iron and ammonia. When a small quantity of peroxide of iron, wet, and newly precipitated from its muriatic solution by ammonia, is thrown into a hot solution of tartaric acid, it soon dissolves into a red, acid, astringent liquid. More of the peroxide, however, causes most of what is dissolved to separate, and the whole becomes a reddish white subsalt. This, like the proto-tartrite, is readily made soluble by saturation with ammonia, and is not disturbed by any excess of alkali. When thoroughly dry, it becomes a very tough tenacious mass, totally different from the other in appearance, and extremely absorbent of the moisture of the air, though not entirely deliquescent. To the taste it is saline and chalybeate, but scarcely, if at all, saccharine. Its solution, boiled for some time with iron filings, lets fall much oxide; and the clear

liquor, by evaporation, passes into the state of the tartrite before described, with its extinguishing liquorice taste and glossy brittleness.

Many other mixtures still more complicated may be produced by taking a salt of iron already formed, adding tartaric acid, and then saturating the whole with ammonia. All these, if enough of the tartaric acid is present, remain undisturbed by excess of alkali. One compound alone I shall now notice, as I think that this also might be usefully employed in medicine—it is the *tartarized sulphate of iron and ammonia*.

Dissolve green sulphate of iron with half its weight of acid of tartar, in a little cold water; add liquid ammonia, which instantly makes it green and turbid, but the solution becomes quite clear when saturated with the alkali. Evaporate to dryness; redissolve with a little more ammonia, filter if required, and again dry. This forms a deep red saline mass, readily and totally soluble in water. The taste is saline and chalybeate, but scarcely saccharine. The solution, in mere water, appears to keep for an indefinite time without the smallest change, the tartar being preserved by the well known antiseptic power of the sulphate of iron. This mixes uniformly with alkalies and neutral salts, but is immediately curdled by spirit of wine. When dissolved in water, in the proportion of two or three grains to the ounce, and with a minute excess of soda, the taste is hardly perceptible. In this case also the iron is probably a mixture of the two oxides. I find that 100 grains of clean sulphate of iron, besides losing its waters of crystallization, acquire an increase of about twenty grains by this treatment; so that, in prescription, twelve grains of the dry tartarized sulphate of iron may be considered as containing ten grains of sulphate of iron, taking the latter in its usual crystallized state.

With this salt may be made a convenient *syrupus ferri*. Dissolve eight scruples of the above tartarized sulphate of iron in two and a half ounces of water; melt it in four ounces

(Troy) of white sugar, and boil for a few minutes. This yields about five ounces of a brown clear syrup, strongly chalybeate, but not unpalatable when properly diluted; and it does not seem liable to ferment. One fluid drachm of this syrup contains four grains of the tartarized sulphate, equal to three and a half grains of sulphate of iron. I have also made some *tartarized muriates of iron* in the same way, which have the same general properties, but do not yield results of any particular interest; and the pungent saline taste of the muriate of ammonia predominates so as to render them less palatable than the others.

REVIEW.

ARTICLE LIII.—*Observations, Chemical and Practical, on the Dublin Pharmacopœia, with a Translation annexed. By F. Barker, M.D., Professor of Chemistry in Trinity College, Dublin, &c. and Wm. F. Montgomery, A.M., M.B. Professor of Midwifery in the King and Queen's College of Physicians in Ireland, &c. 8vo. pp. 720, Dublin. Hodges and Smith, 1830.*

The work of which we have given the title above, is a commentary on the new Dublin Pharmacopœia, published in 1826. The preceding Pharmacopœia of the Dublin College was published in 1807; so that after a lapse of nineteen years, it was high time that a revision should take place of their work, more especially as the interval was remarkable for the great advances which were made in the sciences of chemistry and pharmacy. Dr Barker belonged to the committee for revising the Pharmacopœia, and on him devolved the duty of making the requisite experiments, particularly for that portion of it, which embraces the chemical compounds. The first part of the "Observations" comprising the chemical articles, is by Dr Barker; the second, embracing preparations from plants, and strict pharmaceutical compounds, is from the pen of Dr Montgomery.

The Dublin College, like the London, adopt a system of measures, and divide the wine gallon precisely in the same manner. The only difference consists in the names employed to designate the subdivisions. Thus "libra" is used to mean pint and pound indifferently; but it is under-

stood to mean *pint* when applied to *liquids*. *Ounce* and *drachm*, are made to mean measures, by the qualifying adjunct (*by measure*), corresponding when thus qualified to the more concise expressions, *fluidounce* and *fluidrachm*, of the London College; and *grain by measure* is the sixtieth part of the drachm by measure, corresponding precisely to the minim of the same college.

With the evident improvements of the London College in the nomenclature of measures before them, it is surprising that the revisers of the Dublin Pharmacopœia should have adhered to their faulty system in this respect. Following up this system, it is exceedingly awkward to say, as Dr Barker has done when speaking of Fowler's solution, that the dose is "from four grains increased gradually to twenty *by measure*, three times a day."

Considering the great influence which the British nation exercises in the department of pharmacy, in consequence of her vast colonial possessions, and the general extension of the English language, whereby her codes of pharmacy are received and followed in different parts of the world; it is much to be regretted that a plan, either governmental or voluntary, is not set on foot, to assemble the chief physicians, chemists, and pharmaceutists of England, Scotland, and Ireland, in order to agree upon a common standard for the whole British empire. A work thus matured, especially if done under the auspices of the government, would have merits superior to all its predecessors; and though its adoption might at first be attended with local inconveniences, the general and ultimate good would be incalculable.

It is not our intention to make a formal analysis of the work of Drs Barker and Montgomery, but rather to give a desultory notice of the newest matter which it contains.

The Dublin Pharmacopœia is divided into eleven sections, with the following titles:—I. Acids. II. Alkalies. III. Earths. IV. Alkaline Salts. V. Earthy Salts. VI. Sulphureous Preparations. VII. Metallic Preparations. VIII. Preparations from Plants. IX. Compounds. X. Extemporane-

ous Preparations. XI. Miscellaneous Preparations. The articles in the first seven sections are commented upon by Dr Barker; those in the four remaining ones, by Dr Montgomery.

In the list of the *Materia Medica* of the Dublin Pharmacopœia, we find, among others, the following substances or names newly introduced:—*Acidum Sulphuricum Venale* (commercial sulphuric acid); *Artemisia Chinensis* et *A. Indica*, *Folia*, (moxa); *Cetaceum* (spermaceti); *Diosma crenata Folia*, (buchu); *Ferri Cyanuretum* (Prussian blue); *Iodinium* (Iodine); *Lixivus cinis* (potashes, pearlashes); *Manganesi*, *Oxydum* (oxide of manganese); *Syrupus Empyreumaticus* (molasses); *Sodæ Carbonas Venale* (Barilla); *Strychnos nux vomica* (*nux vomica*).

In the preface Dr Barker says, "To the alterations in nomenclature adopted in the Pharmacopœia, a few additions are made in the present work: thus the prefixes of *super* and *sub* are in almost every instance rejected, and those of *bi* and *di* substituted, as expressing more precisely the relative combining quantities; the prefix of *bi* signifying the double proportion of acid, *di* that of base."

Upon reading this extract, our first impression was that Dr Barker had taken the unwarrantable liberty of altering some of the names of the Dublin Pharmacopœia; but upon further reflection, it would seem that he has merely carried out the plan of using the prefixes above mentioned in his own observations.

The Dublin College have adopted a distinct name for the commercial sulphuric acid, which they do not consider as sufficiently pure for medicinal employment. Accordingly they have given a formula for its distillation, and adopted for the pure acid, the name of *Acidum Sulphuricum Purum*. This we consider as an improvement, as all the commercial sulphuric acid contains sulphate of lead.

The London, Dublin, and United States Pharmacopœias, now agree in calling spermaceti, *Cetaceum*, the Edinburgh College alone adheres to the old name. For Prussian blue

we prefer the name of the United States Pharmacopœia, *Ferri Ferrocyanas*, as being more correct than *Ferri Cyanuretum*. Dr Barker himself would seem not to approve of the Dublin name; as he uses in his observations the term ferroprussiate of iron. Iodine latinized, would form more naturally *Iodinum* rather than *Iodinium*; so also chlorine would make *Chlorinum* more suitably than *Chlorinium*. On these accounts, we would prefer to substitute for the Dublin names, *Tinctura Iodinii* and *Aqua Chlorinii*, the terms *Tinctura Iodini* and *Aqua Chlorini*. Lixivus Cinis is hardly an improvement on the old Dublin term for potashes, namely *Cineres Clavellati*. We prefer the name of the United States Pharmacopœia, *Potassæ Carbonas Impurus*, which merely expresses the fact, that it is an impure carbonated alkali.

Acidum Nitro-muriaticum.—This is a new formula, and is merely an aqua regia. It owes its efficacy to free chlorine, which is disengaged in consequence of the hydrogen of the muriatic acid combining with a portion of the oxygen of the nitric acid, which is thereby in part reduced to the state of nitrous acid. *Aqua Chlorinii* or *chlorine water*, of the same College may be considered, with reference to its principal effects, as the same preparation. Nitro-muriatic acid was long ago praised by Dr Scott of Bombay, as an external application by sponging or in the form of a bath in liver complaint; and no doubt, it is a valuable remedy in certain states of hepatic disease. The propriety of introducing such a preparation as this in a Pharmacopœia may be doubted. At any rate, it ought to have been placed by the Dublin College amongst their extemporaneous preparations; as, on account of its liability to lose a good deal of its chlorine, it ought never to be kept in the shops, but should be made only at the time it is to be used.

Calcis Phosphas Præcipitatum.—This is a new formula of the Dublin College. The bone-earth is dissolved in muriatic acid, and then precipitated pure by ammonia. The process is founded on the fact that phosphate of lime is soluble without decomposition in muriatic acid. It has the advan-

tage over the powdered bone-earth, in being pure and in a state of minute division. It is supposed to be useful in rickets; but we agree with Dr Duncan in considering it inert on account of its insolubility.

Hydrargyri Cyanuretum.—*Cyanuret of Mercury.* This was formerly called prussiate of mercury. It is adopted, now for the first time by the Dublin College, because it is employed in the formula for prussic acid. It is introduced with precisely the same name and for the same purpose, in the new United States Pharmacopœia. The proportions employed by the Dublin College, are six parts of Prussian blue to five of red oxide of mercury; in the United States Pharmacopœia, six of the former to three of the latter. Dr Turner recommends eight of the pure and dried ferruginous salt to eleven parts of the mercurial oxide. The fact is, the proportions cannot be adjusted by any fixed quantities; as the commercial Prussian blue always contains more or less alumina, which has nothing to do with the chemical changes which take place. Perhaps the best directions would be to leave the quantity of the oxide indefinite, and to add it until the blue colour of the ferrocyanate has entirely disappeared, and is replaced by a yellowish colour, and Dr Barker is in favour of this plan.

Aqua Carbonatis Sodæ Acidula.—*Acidulous Water of Carbonate of Soda.* This is the name adopted by the Dublin College for what is familiarly called soda water. The Edinburgh College call it *Aqua Supercarbonatis Sodæ*. In the London and United States Pharmacopœias, there is no corresponding preparation. Dr Barker is probably correct when he considers it as a bicarbonate of soda, dissolved in water holding carbonic acid in solution. It is difficult to give this preparation a good pharmaceutical name; but, perhaps, *Liquor Sodæ Hypercarbonatis* would be preferable to that adopted by the Dublin College. It is not necessary, however, to have such a preparation; as it is easy to direct more or less of a carbonated alkali to be dissolved in a given quantity of Seltzer water. This water is very properly offi-

cinal in the United States Pharmacopœia, and is designated by the appropriate name of *Aqua Acidi Carbonici*. No corresponding preparation has as yet been adopted by the British Colleges.

Speaking of the tartrate of potassa and soda, Dr Barker remarks that: "in the London Pharmacopœia it is named soda tartarizata, but it contains potash as well as soda." Dr B. seems to consider *tartarizata* to mean "combined with tartaric acid;" whereas it means "combined with tartar," and, therefore, includes potassa as an ingredient in the latter. We, however, do not wish to be understood as approving the name of the London College.

At page 173, Dr Barker has allowed several inaccuracies of importance to escape him; chloride of *lime* being in four places printed for chloride of *calcium*.

Magnesia Sulphas Purum.—It will strike our readers with surprise, that the Dublin College should have admitted into their Pharmacopœia, both a sulphate of magnesia and a *pure* sulphate of magnesia; the former in the *Materia Medica*, the latter as a preparation, for which a formula is given. Dr Barker seems to approve of this new formula, as he remarks that sulphate of magnesia, as it occurs in commerce, is sometimes impure; and, therefore, the editors of the Dublin Pharmacopœia thought it proper to give a formula, by which it might be obtained in a perfect state. Epsom salt is certainly occasionally impure as an article of commerce; but this is no more than happens with many commercial salts. The fact of its occasional impurity teaches the apothecary to be on his guard against an impure article, but can hardly render a formula necessary for its preparation. In this country, at least, we have not the least motive for making Epsom salt on the small scale; as it is manufactured in large quantities, and of the finest quality, in different parts of the United States.

Antimonii Oxydum Nitro-muriaticum.—*Nitro-muriatic Oxide of Antimony*. This is the powder of Algaroth, and is essentially the protoxide of antimony. It is the prepara-

tion used by the Dublin College in their process for tartar emetic; and according to the comparative experiments of M. Henry with the different varieties of protoxide used for this purpose, the oxide of the Dublin College was found to answer best. On the authority of these results, the American Medical Convention discarded their former process, in which the subsulphate was used as recommended many years ago by Mr Phillips, and adopted the Dublin process in the revised edition of their Pharmacopœia of the present year. No separate formula is given in the United States Pharmacopœia for this oxide, which, consequently, is not designated by any pharmaceutical name; but it is prepared as one of the steps of the process for making tartar emetic. By taking this course the American Convention have avoided the difficulty of devising a good pharmaceutical appellation for the powder of Algaroth. The exact chemical constitution of this powder is matter of dispute. Though we admit this, still we cannot approve of the term *nitro-muriatic oxide*. We agree with Dr Barker that the powder in question, *when well washed*, as it is directed to be in the formula, is protoxide of antimony. As the other two compounds of antimony and oxygen are acids, this one might be called, without ambiguity, simply oxide of antimony, in Latin *Antimonii Oxydum*. At any rate, it is highly incorrect to give names to chemical preparations, partly descriptive of their mode of preparation; and this is the objection we make to the name *nitro-muriatic oxide*. Following out this faulty system, the Dublin College have a *nitric oxide of mercury* (red precipitate), and a *sulphuric oxide of mercury* (turpeth mineral!) A pharmaceutical name should indicate as near as possible the composition of a preparation, so long as pharmaceutical convenience is not disregarded; and the mode of preparation is left to be determined by the usage of the place in which it is to be employed. It would be possible to have an oxide of antimony made by means of sulphuric acid, of muriatic acid, or of nitro-muriatic acid; but are we on that account

to admit a sulphuric oxide, a muriatic oxide, and a nitromuriatic oxide of antimony.

As connected with the oxide of antimony, we may mention, that, by a coincidence, the pharmaceutical name of the Dublin and United States Pharmacopœias is precisely the same for tartar emetic, namely, *Antimonii et Potassæ Tartaras*. The name, however, of the Dublin College for antimonial wine, *Liquor Tartari Emetici*, is peculiarly awkward.

Hydrargyri Persulphas.—*Persulphate of Mercury.* The Dublin College have introduced this preparation in their new Pharmacopœia for the first time with a distinct formula. This is an improvement, as Dr Barker justly remarks; because as this salt is employed in preparing calomel, corrosive sublimate, and turpeth mineral, it saves repetitions to give a formula for it once for all, and then to direct it when required under a given name. We do not know that we like the name adopted here by the Dublin College. The niceties of chemical nomenclature cannot, it is true, be followed in pharmaceutical names; and if it were possible to follow them, persulphate of mercury is not a correct name for this salt, as it is equally applicable to turpeth mineral, which the Dublin College absurdly calls *sulphuric oxide of mercury*. Perhaps the best name for the white salt would be *Hydrargyri Sulphas Albus*, while the best appellation for the turpeth mineral is the one adopted in the United States Pharmacopœia, *Hydrargyri Sulphas Flavus*.

In the formula for their persulphate of mercury, the Dublin College direct a portion of nitric acid, equal to one-sixth of the weight of the sulphuric acid employed. The nitric acid is not necessary to obtain the product, but Dr Barker assures us that it much facilitates the process, which is completed in a much shorter time than if sulphuric acid alone were employed. Besides, its employment ensures the full peroxidation of the metal, and a much whiter salt is obtained. No doubt these observations of Dr Barker are correctly made; but the greater expense of the process when nitric acid is used,

will always be an objection to its employment, where large quantities of the salt are manufactured. Much diversity obtains as to the proportions of sulphuric acid and mercury employed. The London College use the proportions of 6 of acid to 4.8 of metal; and the Edinburgh College, the same in the process for corrosive sublimate; but 6 of acid to 4 of mercury in the formula for turpeth mineral. The framers of the United States Pharmacopœia follow the varying Edinburgh proportions precisely, and the Dublin College adopt equal parts. Theory calls for 196 parts only of strong sulphuric acid to 200 parts of mercury, to form the white salt in question, which, it will be recollected, is a bisulphate of the peroxide. The Dublin proportions come the nearest to the equivalent quantities, and, indeed, too near for practice; for, considering that the acid may not be of full strength, and may be partly lost during the ebullition, it would not perhaps be sufficient, were it not that the nitric acid in the Dublin formula performs to a considerable extent the oxidation of the metal. Upon the whole, the proportions used in the processes for the chlorides, adopted by the London and Edinburgh Colleges, are perhaps the best for forming the bipersulphate; but we do not see the reason why the Edinburgh College should make the same salt by the use of other proportions of the ingredients, when it is to be employed in the formation of turpeth mineral. If this criticism be just, it applies also to the United States Pharmacopœia, which conforms with the Edinburgh in this respect. The London College have no formula for turpeth mineral.

The Dublin College have deserted their old name for calomel, *Submurias Hydrargyri Sublimatum*, and substituted *Calomelas Sublimatum*; while they still retain their former name for corrosive sublimate, *Hydrargyri Murias Corrosivum*. No doubt it was a knotty point with the College to devise an appropriate name for the former preparation. The committee of revision consisted of chemists too well versed in modern science, to allow the appellation of submuriate of mercury to pass; as upon no view of its composition is calomel a

subsalt. The difficulty consisted, therefore, not so much in agreeing to discard the old term, as in substituting a new one. It is probable that no chemical term, deemed satisfactory, presented itself; and the old pharmaceutical name was necessarily resorted to. With regard to corrosive sublimate it may be considered a bimuriate of the peroxide on the old theory; and the same, when in solution, even according to the new. Perhaps considerations such as these may have weighed with the revising committee in retaining a term, conveying what we deem an erroneous view of the composition of the preparation. It would have been better if the Dublin College had here returned to the ancient name of corrosive sublimate, rather than to call one of the chlorides of mercury by an unmeaning pharmaceutical name, and the other by an incorrect chemical name. We confess we prefer the names of the United States Pharmacopœia, *Hydrargyri Chloridum Mite* for calomel, and *Hydrargyri Chloridum Corrosivum*, for corrosive sublimate. They have the merit of being scientifically correct, and at the same time, no mistake can arise from their use; for as the apothecary, from long habit, has been accustomed to associate the abbreviation, *Corros.*, with the poisonous chloride, he will never think of putting it up, unless he sees that adjunct.

We now come to the second part of the book before us, or the portion prepared by Dr Montgomery.

Tinctura Seminum Colchici.—*Acetum Colchici.*—*Oxymel Colchici.*—The first and third of these preparations are peculiar to the Dublin College; the second is officinal also in the London and United States Pharmacopœias, but not in the Edinburgh. To the first, the nearest corresponding preparation of the London Pharmacopœia is the *Spiritus Colchici Ammoniatus*,—of the United States Pharmacopœia, the *Vinum Colchici Seminis*. Thus the seeds are prepared in the three different ways, of tincture, ammoniated tincture, and wine. The Edinburgh College, it will be recollected, have no preparation of the seeds. The *Syrupus Colchici Autumnalis*, Edin. Pharm., and the *Syrupus Colchici*, U. S. Pharm.,

may be considered as equivalent to the oxymel of the Dublin; the only difference being, that in the two former preparations, the bulb is prepared with vinegar and sugar, whereas in the latter it is prepared with vinegar and honey. The above is a synopsis of the meadow-saffron preparations in the British and United States Pharmacopœias.

With regard to the employment of the seeds, Dr Montgomery says, "The use of the seeds in making the vinous infusion or tincture instead of the bulb, as possessing the virtues of the latter without many of its objectionable qualities, has been lately recommended, particularly by Dr Williams of Ipswich. The tincture, so prepared, has as great and as certain a remedial influence as the bulb, whilst it is less liable to purge and nauseate."

The oxymel of meadow-saffron is prepared by first making a vinegar of the root, and then *boiling* this *down* with the honey to the consistence of a syrup. We agree with Dr Montgomery in the belief that the colchicum will be apt to be injured by the boiling, and that, therefore, the preparation will be uncertain in strength. The syrups of meadow-saffron of the Edinburgh and United States Pharmacopœias are not liable to this objection.

Tinctura Piperis Cubebæ.—The Dublin College introduced the cubebs for the first time in the recent edition of their Pharmacopœia; but Dr Montgomery is in error, when he says that it is not officinal with the London College, as it is enumerated in their Materia Medica under the name of *Cubeba*. This tincture, however, is peculiar to the Dublin College. Dr Montgomery makes the following remarks respecting it as a remedy in gonorrhœa:

"It has been objected to this tincture, that 'the spirit is likely to undo the good effects of cubebs on the mucous membrane of the urethra;' this may be very plausible in theory, but I know it is not true in fact; I have found this tincture cure gonorrhœa both speedily and satisfactorily." Dose, from one to two fluidrachms three times a day.

Tinctura Nucis Vomicae.—*Extractum Nucis Vomicae*.

These are new preparations of the Dublin College, and very properly introduced into their Pharmacopœia. They are not to be found in the United States Pharmacopœia, though the *nux vomica* itself is adopted in the *Materia Medica* of that work.

Acetum Opii.—This is a new preparation of the Dublin College, being a scientific substitute for the black drop. It is deemed to be half as strong again as laudanum, and is made with four ounces of opium to the pint of distilled vinegar. Its active constituent is of course acetate of morphia, and, therefore, it may be doubtful whether it has any superiority over that salt. Indeed the latter has the advantage in this respect, that it does not contain narcotin. Dr Montgomery states that he has found the vinegar of opium decidedly superior to every other preparation, in relieving the agony of cancer uteri, and in procuring rest at night. The United States Pharmacopœia does not embrace this preparation, but it has an acetated tincture of opium, which may be considered as nearly equivalent; at the same time, it embraces among its preparations, *morphia*, *acetate of morphia*, and *sulphate of morphia*.

Unguentum Acidi Sulphurici.—This ointment is peculiar to the Dublin Pharmacopœia. It consists of a drachm of sulphuric acid rubbed up with an ounce of lard. Dr Montgomery says respecting it :

“ When the lard and acid are mixed, the only appreciable change that appears to result, is a change of colour in the mixture; it becomes of a bright buff colour, which afterwards becomes darker, until it is nearly of the colour of the unguentum calaminæ, or *Turner's cerate*.”

The ingredients ought to be mixed in a glass or earthenware mortar. An iron spatula or marble slab ought not to be used, as they would be acted upon by the acid.

This ointment is supposed to be useful in itch.

Unguentum Conii.—New formula. It is made by boiling two pounds of the fresh leaves in an equal weight of lard, until they become crisp, and then expressing through linen.

Unguentum Scrophulariæ.—*Ointment of knotty-rooted Figwort.* This ointment is peculiar to the Dublin Pharmacopœia. It is formed by boiling two pounds of the fresh leaves of the plant in an equal weight of lard, and one pound of mutton suet. Dr Montgomery makes the following statement respecting it:

“The virtues of this ointment were first brought into notice by Dr Whitley Stokes, on account of its great efficacy in curing a malignant disease to which children are liable, generally called “burnt holes,” and for which Dr Stokes proposed the name of *pemphigus gangrenosus*, in the cure of which complaint it has been found to act almost as a specific.”

Emplastrum Belladonnæ.—New formula. Made by incorporating an ounce of Extract of Belladonna with two ounces of soap plaster. Used as a topical application to neuralgic and other pains.

We now come to the section of Extemporaneous Preparations. Of these we shall notice a few only.

Cataplasma Aluminis.—New formula. Whites of two eggs to a drachm of alum, shaken well together.

Decoctum Hæmatoxyli.—Shavings of logwood, an ounce and a half; cinnamon bark, bruised, a drachm; water, two pints. Boil down to a pint; add the cinnamon near the end of the boiling, and strain. This formula does not occur in the other British Pharmacopœias, but a similar decoction has been introduced into the new United States Pharmacopœia, the proportions being slightly different, and the cinnamon not being directed.

Decoctum Pyrolæ.—*Decoction of Winter Green.* An ounce of the plant to two pints of water, macerated for six hours, and evaporated to a pint. This decoction is not ordered by the London or Edinburgh College; nor does it appear in the United States Pharmacopœia, though the plant itself is officinal under the pharmaceutical and trivial names of *Chimaphila*, or *Pipsissewa*. It is a decoction which might very well be left to extemporaneous prescription.

Decoctum Taraxaci.—Decoction of Dandelion. Fresh herb and root of dandelion, four ounces; water two pints; boiled down to a pint and strained. This formula does not occur in the other British Pharmacopœias. The extract, however, is officinal with the Dublin and London Colleges, and is to be found in the United States Pharmacopœia. In the Dublin and Edinburgh Pharmacopœias, the herb and root are both officinal; in the London and American, the root only.

The dandelion has been too much neglected as a remedy in the United States. The following remarks are made on it by Dr Montgomery. "Dandelion has long been a popular remedy in hepatic derangements and visceral diseases, and several eminent physicians, both in this country and on the continent, particularly in Germany, have recently borne testimony to its efficacy in such disorders. Boerhaave, and several of the older physicians, entertained a high opinion of its deobstruent powers. At present it is given in jaundice, dropsy, and dyspepsia; in the latter it is particularly recommended by Dr W. Philip, who considers it best adapted to those cases in which the bile is deficient or much disordered, while the power of the stomach is still considerable."

Infusum Buchu.—Tinctura Buchu. These are preparations from the leaves of the *Diosma crenata*, and are peculiar to the Dublin Pharmacopœia. The infusion is made from an ounce of the leaves to a pint of boiling water; the tincture, from two ounces of the leaves to a pint of proof spirit. The plant which yields these preparations is thus described by Dr Montgomery.

"The *Diosma crenata* is a native of the Cape of Good Hope, of the class Pentandria, Monogynia: Nat. Ord. Rutaceæ. The leaves are borne on the extreme twigs, nearly in a verticillated order. They are petiolate, coriaceous, alternate, sometimes opposite; ovato-lanceolate, nearly pointed, about an inch in length, and half an inch in breadth, with the margin crenated. The upper surface is smooth and of a beautiful bright green; the under is pale and spread with translucent glandular points.

"The dried leaves are liable to be mistaken for those of senna; but their form is different, being much broader in proportion to their length than those of senna, which are also smooth along the margins, while the buchu leaves are indented and crenated. The smell also is aromatic and peculiar, and their taste, when chewed, pungent, and communicating a flavour resembling that of peppermint."

"Buchu leaves are used as a tonic, sudorific, and diuretic. They have been found useful in rheumatism, in chronic catarrh, and in chronic retention of urine."

The preparations of buchu may be obtained from several of the apothecaries of this city. Dropsical affections are the diseases in which it has been supposed to prove most serviceable.

Mistura Camphoræ cum Magnesiâ.—This formula is peculiar to the Dublin Pharmacopœia, and newly introduced. It is made by triturating twelve grains of camphor with half a drachm of carbonate of magnesia, and adding, gradually, six fluidounces of water. Dr Montgomery states that this preparation has been found very beneficial in the uric acid diathesis, and also in irritations of the neck of the urinary bladder, particularly when given in combination with hyosciamus.

Mistura Ferri Aromatica.—This is a very old preparation, formerly known by the name of *Heberden's Ink*, now first introduced into the Dublin Pharmacopœia, to which it is peculiar. It is made by digesting for three days in a close vessel, an ounce of Peruvian bark, three drachms of columbo, two drachms of cloves, and half an ounce of iron filings, with as much peppermint water as will be sufficient to afford twelve fluidounces of strained liquor; to which are added compound tincture of cardamoms, three ounces, and tincture of orange peel, three drachms. Dr Montgomery states it to be a most valuable tonic medicine in weak conditions of the stomach, arising from dyspepsia, and in various forms of debility.

Dose. From half a fluidounce to two fluidounces.

Aqua Chlorinii.—This is the *Aqua Oxymuriatica* of the old edition of the Dublin Pharmacopœia. It is merely a solution of chlorine gas in water. Dr Montgomery is in error when he supposes this gas to be rapidly absorbed by water.

This preparation has been strongly recommended as a stimulant and antiseptic in scarlatina and malignant sore throat. It is probable, however, that whatever virtues it may possess, are to be found, in a more convenient form, in the solution of chloride of soda, (Labarraque's disinfecting liquid.)

Iodinium.—*Potassæ Hydriodas.*—*Tinctura Iodinii.*—*Unguentum Iodinii.*—*Unguentum Potassæ Hydriodatis.* The Dublin is the only British Pharmacopœia which embraces iodine among its preparations. It is officinal, however, under the name of *Iodinum*, in the United States Pharmacopœia, as well as its more important preparations, such as *Potassii Iodidum* (incorrectly called by the Dublin College, *Potassæ Hydriodas*, which it only is in solution), and *Tinctura Iodini*. The ointments are left in the American work to extemporaneous prescription.

The hydriodate of potassa is directed by the Dublin College to be formed by passing a stream of sulphuretted hydrogen through water, holding iodine in suspension; saturating the hydriodic acid thus generated with carbonate of potassa, and evaporating to dryness. The salt is then purified by means of alcohol, which takes up the pure salt and leaves the impurities. The alcoholic solution is then evaporated to dryness.

Commenting on this process, Dr Montgomery seems to give the preference to that of Dr Turner, which consists in saturating a hot solution of pure potassa with iodine, which generates iodate and hydriodate of potassa; and then passing through the solution a stream of sulphuretted hydrogen, which has the effect of converting the iodate into hydriodate of potassa. The same preference was felt by the United States Convention; and accordingly they have adopted the process of Dr Turner in the edition of their Pharmacopœia,

recently published. A still easier process, however, is one mentioned by Dr Turner; that of neutralizing exactly, a solution of hydrosulphate of potassa (common sulphuret of potassa dissolved in water) by iodine. Here the iodine takes the place of the sulphur, which is precipitated, and of course the hydriodate is formed at once, without the necessity of a stream of sulphuretted hydrogen. Whichever way it is procured, the preparation is a hydriodate only in solution, becoming invariably iodide of potassium when evaporated to dryness.

Speaking of the solution of hydriodate of potassa, formed by dissolving thirty-six grains of the salt in a fluidounce of distilled water, Dr Montgomery remarks, "I am informed by my friend Dr De Renzy, of Carnew, that he has found such a solution act almost as a specific in the cure of hæmoptysis, and I have already adverted to a case in which the use of iodine appeared decidedly to restrain uterine hæmorrhage." "It has also succeeded, under the management of Dr Graves, in curing that very troublesome and unmanageable swelling of the hand, described by him under the name of recurrent erythema." *Dose*—from one to three grains of the salt, or from five to twenty drops of the solution.

The Dublin tincture of iodine is made by dissolving two scruples of iodine in a fluidounce of alcohol, which is five drachms and a scruple to half a pint. The tincture of the United States Pharmacopœia is weaker in its proportions, as it contains only half an ounce of the iodine to half a pint of the spirituous menstruum; but it is probable that both tinctures are saturated solutions, and, therefore, in fact, equally strong.

The ointments of iodine and of hydriodate of potassa of the Dublin College are severally made with a scruple of the medicinal preparation to an ounce of lard.

Quinina Sulphas.—This preparation has been very properly introduced into the Dublin Pharmacopœia, and no doubt will appear in the London and Edinburgh Pharmacopœias, upon the next revision of those works. It has also been introduced into the new edition of the United States

Pharmacopœia, under the more euphonic title of *Quinia Sulphas*. Speaking of its therapeutical powers, Dr M. states that he has found it to act almost as a specific in the cure of infantile erysipelas. He also records the observation of Dr Harty, that it possesses the power of rendering the system more susceptible to the influence of mercury.

We have now gone over the chief additions to the new Dublin Pharmacopœia. The following is a list of the principal articles, newly introduced, but not adopted from the other British Pharmacopœias, with the synonymes annexed of the United States Pharmacopœia, whenever the article occurs in that work.

Acidum Nitro-muriaticum. Acidum Prussicum (Acidum Hydrocyanicum, U. S. P.). Acidum Sulphuricum Purum. Unguentum Acidi Sulphurici. Cataplasma Aluminis. Ammonię Bicarbonas. Unguentum Tartari Emetici. Argenti Nitratiss Crystalli. Atropę Belladonnę Radix. Emplastrum Belladonnę. Calcis Phosphas Pręcipitatum. Mistura Camphorę cum Magnesiâ. Quininę Sulphas (Quinię Sulphas, U. S. P.). Cocculi Suberosi Fructus (Cocculus Indicus). Colchici Autumnalis Semina (Colchici Semen, U. S. P.). Tinctura Seminum Colchici. Unguentum Conii. Cataplasma Conii. Cupri Acetas (Crystallized Verdigris). Diosmę Crenatę Folia. Infusum Buchu. Tinctura Buchu. Mistura Ferri Aromatica. Ferri Cyanuretum (Ferri Ferrocyanas, U. S. P.). Aqua Calcis Composita. Decoctum Hęmatoxyli (Idem, U. S. P.). Hydrargyri Persulphas. Hydrargyri Cyanuretum (Idem, U. S. P.). Iodinium (Iodium, U. S. P.). Tinctura Iodini (Tinctura Iodini, U. S. P.). Unguentum Iodini. Extractum Kramerię Triandrę. Magnesię Sulphas Purum. Infusum Menthę Simplex. Momordicę Elaterii Folia. Acetum Opii. Tinctura Piperis Cubebę. Unguentum Piperis Nigri. Potassę Hydriodas (Potassii Iodidum, U. S. P.). Unguentum Potassę Hydriodatis. Aqua Laurocerasi. Punicę Granati Cortex Radicis. Punicę Granati Flores. Pyrola Umbellata (Chimaphila, U. S. P.). Decoctum Pyrolę. Ranun-

culi Acriæ Folia. Ranunculi Flammulæ Herba. Unguentum Scrophulariæ. Pulvis Seminum Sinapis Nigræ. Infusum Sarsaparillæ Compositum. Extractum Sarsaparillæ Fluidum. Sodæ Acetas (Idem, U. S. P.). Tinctura Nucis Vomiciæ. Extractum Nucis Vomiciæ.

Besides these, there are a number of new medicines adopted either from the London or Edinburgh Pharmacopœia.

The Dublin College have made some important reforms in their nomenclature; but still there is room for many more. They have very properly deserted *kali* as the name of the vegetable alkali, and substituted *potassa*. The following are instances of their improvements: Acidum Nitricum for Acidum Nitrosum; Antimonii et Potassæ Tartras for Tartarum Antimoniatum; Aqua Chlorinii for Aqua Oxymuriatica; Calcis Carbonas for Creta; Magnesiæ Carbonas for Magnesia; Magnesia for Magnesia Usta; Mistura for Lac; Liquor Plumbi Subacetatis for Liquor Subacetatis Lithargyri; Sodæ et Potassæ Tartras for Tartarus Sodæ et Kali; Tinctura Camphoræ for Spiritus Camphoratus; Unguentum Hydrargyri Nitratis for Unguentum Supernitratis Hydrargyri; Ammonia Murias for Sal Ammoniacum; Sodæ Boras for Borax; Plumbi Carbonas for Cerussa; Plumbi Oxydum Semivitreum for Lithargyrum; Potassæ Nitras for Nitrum; Potassæ Bitartras for Crystalli Tartari, &c. Besides these changes, there are the following improvements in the names of articles adopted from the other British Colleges:—Ammonia Carbonas for Ammonia Subcarbonas; Potassæ Bicarbas for Potassæ Carbonas; Sodæ Bicarbas for Sodæ Carbonas; Potassæ Bisulphas for Potassæ Supersulphas, &c.

We have now brought our remarks on the work of Drs Barker and Montgomery to a close. Availing ourselves of the privilege of a reviewer, we have extended our analysis to the new edition of the Dublin Pharmacopœia, and hence may have appeared to be somewhat discursive in some of our observations. But this was in some measure unavoidable; as it was hardly possible to give the reader an account of the commentary of the authors, without constantly referring to their

text. Dr Barker, who prepared the first or chemical part of the "Observations" has acquitted himself in a creditable manner. He has very judiciously adopted the hydrogen unit for equivalents. Dr Montgomery, also, who undertook the second part, comprising the vegetable medicines and preparations, has executed his portion of the labour equally well. With these impressions, and with so much more to praise than to blame, we take leave of the authors, at the same time thanking them for the pleasure and instruction which their performance has afforded us in the perusal.

Minutes of the College.

Sept. 27th, 1831. The Board of Trustees reported the election of G. W. Andrews of Baltimore, as an associate member.

It was on motion resolved, that a committee of fifteen members, of which the President shall be chairman *ex officio*, be appointed to examine the American Pharmacopœia, and report to the President the results of their experiments and observations; and that he be requested to prepare a digest of these reports to be read at the stated meeting of the College in December, 1832. Whereupon the following members were appointed: D. B. Smith, Charles Ellis, Elias Durand, J. Scattergood, C. H. Dingee, Wm. Hodgson, Jun., John Farr, R. E. Griffith, Dillwyn Parrish, John Carter, Wm. R. Fisher, Wm. Biddle, E. B. Garrigues, Jos. Bringhurst, Thos. Evans.

It was resolved, that the committee be directed to apprise all the resident and associate members, of the objects of this appointment, and request their co-operation.

A letter from M. Robiquet, Sec. general of the Society of Pharmacy of Paris, was read, accompanied with a donation of some of his works. Resolved, that the corresponding secretary be directed to reply to the communication, and express the desire of the College to maintain an active correspondence with the Parisian Society.

The following papers were read and referred to the committee of publication :

Upon the "Oil of Cantharidin," by Jos. Scattergood; and

upon Salicine, accompanied by a specimen, by Wm. R. Fisher and P. T. Tyson."

A specimen of cholesterine was presented by Dr James B. Rogers of Baltimore.

The semi-annual election for trustees was then held, and the following gentlemen duly elected : Peter Lehman, A. S. Roberts, Chas. Shaffer, jr., S. P. Griffiths, jr., S. F. Troth, G. B. Wood, Wm. Hodgson, jr., Jos. Scattergood.

Oct. 25, 1831. The Board of Trustees reported a code of bye-laws adopted by them, for their government.

A letter from Oliver Hull, secretary of the College of Pharmacy of New York was read, inclosing resolutions of that College relative to the graduation of students, viz. "At a meeting of the College of Pharmacy of the city of New York, held July 15th, 1831, the following preamble and resolutions were adopted: Whereas the interests of science in general are promoted by a friendly co-operation on the part of institutions embracing similar objects, and whereas the Colleges of Pharmacy of the cities of Philadelphia and New York have in view the same important ends, the advancement of pharmaceutical knowledge, and the improvement of those who may be preparing to commence the business of apothecaries; therefore, Resolved, that this College receives with much satisfaction the friendly expression of good will, and offer of co-operation, made by the College of Philadelphia, and cordially unites in rendering the favour reciprocal, as far as our charter will permit. Resolved, that a regular apprenticeship with a member of that college, and the attendance of one full course of lectures established by it, be sufficient to entitle a student who may subsequently attend two full courses of lectures in the School of Pharmacy of this College, the latter of which shall be gratuitous, and shall pass the required examination in a satisfactory manner, to receive the degree of graduate of the College of Pharmacy of the city of New York."

A communication from Amable J. Brasier, on Sugar from the Seckel Pear, was read and referred to a select committee.

November 29, 1831. The Board of Trustees informed the College, that they had authorised a committee to purchase a lot of ground for the use of this Institution. This resolution was approved by the College.

The committee to whom was referred Mr Brasier's communication, made a report, which with the original communication were referred to the committee of publication.

The following gentlemen were duly elected honorary members: Dr Benjamin Silliman, New Haven; Dr John B. Emmet, Charlottesville, Va; Dr Freeman Dana, Boston; Dr James B. Rogers, Baltimore;—and John T. Barry, Robert Alsop, London, and Dr Alex. Duncan, Edinburgh, as foreign members.

The following papers were read and referred to the committee of publication: On the sap of the *Siphonia cahuchu*, accompanied with a specimen, by Elias Durand; on the bitter principle of the *Podophyllum peltatum*, with specimens, by William Hodgson, jr.; on nitro-muriatic acid, by Daniel B. Smith.

Obituary.

NOTICE OF DR BENJAMIN ELLIS.

[Read by appointment before the Philadelphia Kappa Lambda Society, Dec. 14, 1931. By B. H. Coates, M.D.]

The sketch of the life and history of its departed members which it is the custom of this society to preserve, has other and higher purposes, than the gratification of individual partiality, or the supplying an imperfect balm to the wounds of divided friendship. It is undoubtedly with reason that the founders of our body have considered as among its most desirable objects the promotion of personal intimacy and regard among those of whom it is constituted. Yet, in compiling these brief records, there exists the further view of at once inciting ourselves to imitate the merits of the deceased, and adding a new stimulus to well-doing, by reflections, daily renewed, upon the opinions which will be expressed of us by our friends, after the tomb shall have closed over our remains, and when the lips which might have been eager and prompt in explanation, shall lie silent beneath the cold seal of the clod of the valley. Who would not wish, at the termination of this changeable career, to leave kindly impressions behind him? Who can avoid feeling a regard for posthumous reputation—a deference for that judgment which can no longer be suspected of receiving a bias from the obliquities of interest? Who can fail to entertain, with generous emotion, a sentiment which operates as a constant impulse

to emerge beyond the clouds of selfishness, and add further practice and development to all the loftier qualities of our nature? To awaken these reflections, a purpose far beyond the indulgence of vanity, is the object of *NECROLOGICAL NOTICES* and *FUNERAL EULOGIUMS*.

If all historical narration be defined as "philosophy teaching by examples," there is surely no department of its diversified pages which possesses a more useful practical bearing than that which relates to the lives and conduct of men in the honourable discharge of public and private duties; and in none of these is the benefit conferred more substantial than in the pursuits of science, and the walks of daily and domestic life. It is not the warrior, whose exploits have commanded the wonder and admiration of contending nations, that furnishes the most appropriate object for the future contemplation and emulation of his kind. His footsteps are tracked in blood, his breath scatters fire and pestilence, and his destroying energies are perhaps more frequently employed in favour of the wrong, than of the righteous cause. It is not the statesman, whose brain, fertile in intrigues, and continually pondering the purchased secrets of foreign nations, is deep absorbed in the double effort to aggrandize his own community and to extend and perpetuate his individual importance. His station is, from the nature of things, capable of being held by few; his labours confined in the sphere of their questionable utility to a particular nation and a particular age; the usefulness of his actions is vitiated and often entirely destroyed by the exertions deemed necessary to sustain his own power; his popularity and official station, upon which his opportunities of benefiting the community depend, and which are frequently purchased at the dear expense of degraded character, are certain, sooner or later, to succumb to the fluctuating violence of public commotion; and his best laid plans and most honourable schemes, to be thwarted by selfish and unprincipled opposition, or poisoned to annihilation by the suspicion of his motives.

In the shades of private life, on the other hand, we meet

with examples and precedents applicable to the experience of many ; and in the extension and diffusion of science are found labours whose beneficial results extend to remote times and foreign countries. If, in these days of scientific nationality, a learned and observing individual cannot always be said to belong to the whole civilized world, or to the human race in the abstract, the results of his researches are frequently embodied in the inquiries made in foreign countries, and his toils, if really useful, are felt in their consequences by succeeding generations. He who adds a brick to the temple of knowledge, which, as is said to have been the case with the great cathedral of St Peter, remains, from age to age, continually in the process of construction, contributes to support the additional walls and columns which shall be erected upon it by the architects of future times ; and thus secures to himself a memorial, which, however humble, will probably, encased in such an imperishable building, endure as long as our species shall continue to cultivate learning. Though the studies of the inquirer into nature at the moment of their prosecution frequently interest but few, yet when their value comes to be multiplied by repeated use in successive ages, or, as is occasionally the case, in foreign countries, the amount assumes a more imposing magnitude. The experimental observer, from a solitary, unconnected student, swells into a benefactor of the whole human race, or at least of that portion of it which continue to use and cultivate the language he employs. In like manner, the utility of an example in private life receives a similar augmentation, in exact proportion to the number to whom it is applicable, and who have or take the opportunity to profit by it. When handled by one of those eminent writers whose talents and reputation give general currency to what they produce, the memoirs of private individuals frequently become valuable and widely diffused treasures ; they furnish lessons to the multitude, and their importance is national.

These reflections have struck me as being not inapplicable to an obituary notice of our departed friend. Though

limited to a small number, the feelings of the members of this society are invoked, on such occasions, for an object of zeal, dignity and usefulness. Let us not dishearten labourers in the field of valuable science and professional toil by denying to their tasks the elevation and importance to which their claims are so justly founded.

Dr Benjamin Ellis was born in Muncy, Pennsylvania, May 5, 1798. He was the son of William and Mercy Ellis; the heads of a respectable landholding family of that vicinity, one of the members of which has since represented his district in Congress. His early education was in strict conformity with the opinions of the religious society of Friends, in whose connexion he continued till his death, complying steadily with all the requisitions of their discipline. His years of boyhood, including those employed in the acquisition of the first elements of knowledge, were spent upon his paternal estate; and this circumstance developed in his mind an attachment to rural life and to the mountainous scenery in which he found himself placed. At an early period, however, he was sent to a seminary at Manhattanville, near New York, at which he completed his English education and studied Latin and French; with which languages he afterwards extended his acquaintance while under the pressure of other engagements. During his residence at Manhattanville, his attention was first drawn to the science of chemistry; an occurrence arising out of the ordinary exercises of the institution. In pursuit of information on this subject he proceeded, three times a week, and at the distance of eight miles from his lodgings, to attend a course of lectures delivered by professor Griscom, in the city of New York, in the year 1815. After the conclusion of his academic engagements, and another short residence at Muncy, he applied himself to the study of pharmacy. On the part of Dr Ellis, this profession was undertaken in a liberal and philosophical spirit, embracing a view to the further prosecution of chemistry, and a determination to employ for practical usefulness, all the applicable resources which science afforded, and which

were within his reach. In the pursuits of these objects, he spent several years in an eminent establishment in this city, where he acquired the best title to be considered as practically acquainted with the *Materia Medica*. His determination, subsequently, to devote himself to the study and practice of medicine, was entirely the result of his own reflections, he having acted, in this respect, with entire independence, although he always entertained the greatest respect and estimation for the opinions of his friends. While a student of medicine, he was appointed house pupil of the Philadelphia Dispensary; charged, in addition, with the duty of attending cases of midwifery. In due time, he passed through the studies and complied with the requisitions prescribed by the University of Pennsylvania, in which he took the degree of Doctor of Medicine, April 4, 1822; having presented a thesis "on Marsh Effluvia." He was, subsequently, elected one of the physicians of the Dispensary; and again, one of those employed by the board of guardians to attend to the out-door poor. In the whole of these arduous and thankless duties, Dr Ellis gave attendance with the most scrupulous care and the most unexhausted patience; adding one more to the list of young physicians, who have bestowed so large a share of their best years upon the public service without any reward.

In May 1824, he was married, according to the order of the Society of Friends, to a most amiable lady, who now survives him.

After he had been some years in practice, and when the Philadelphia College of Pharmacy was instituted, it was expected by Dr Ellis's friends that he would take an active part in it. His pharmaceutical studies and experience, and his particular fondness for chemistry, strongly pointed out this course; the only one in which his various labours, including those of a medical character, could be brought to co-operate for a common object. Accordingly, we find him, in June 1827, elected Professor of *Materia Medica* in that college, in the place of Dr Samuel Jackson, who had resigned the situation. In this capacity, Dr Ellis delivered four courses of lectures,

to an auditory embracing a large portion of the young candidates for pharmaceutical confidence in our city. In addition to this, he had at one time, with much labour, prepared a popular course on chemistry; to attend which a respectable class was secured; when, by circumstances of another kind, and unforeseen by the lecturer, the project was thwarted and proved finally unsuccessful.

Besides these means of diffusing knowledge, the want was early felt for a periodical journal, to be devoted to pharmaceutical subjects alone. Among the originators of the *Journal of the College of Pharmacy*, Dr Ellis was one of the most active. He contributed several editorial and other articles to the first series of that publication; and conducted it, for the four last numbers, as editor. On the failure of the first series, our fellow member was earnest and persevering in his efforts for the establishment of a new one; which was effected, owing, it is said, in a great measure to his exertions. This series is the very respectable and valuable journal which has continued, in growing usefulness and increasing character for scientific knowledge, to the present day. Dr Ellis continued, aided by a committee of the College, to edit this work, as far as the number for April 1831; when his labours were interrupted by death.

In addition to these complicated tasks, and to a respectable private practice, Dr Ellis was elected one of the physician accoucheurs to the Philadelphia Alms House; the duties of which office he discharged with credit for the last two years of his life.

Such were the pursuits and occupations of our departed friend, when in the midst of plans and active efforts for the promotion of science and the extension of an honorable name, death, that comes to all, that arrests alike the conqueror in his march, and the ploughman at his furrow, put a sudden period to these diversified labours. About the middle of April last, Dr Ellis was seized with the symptoms of that description of sore throat which so frequently accompany epidemics of scarlatina; and in the course of the dis-

ease, the scarlet eruption was manifested, though in an irregular manner. The sufferer had a mind above superstition; yet his friends could not help remarking the repeated assurances he gave them of a strong presentiment that, if he were ever attacked with this disease, it would prove mortal. Accordingly, after a duration of four or five days, and after some intervals affording flattering hopes, the white exudation formed itself over the whole surface of his mouth, fauces, and pharynx; and on the morning of the 23d, after an illness of about a week, he expired. His death was apparently accompanied with less of physical suffering than had been anticipated; and he was thought to retain his intellectual faculties to the last. Many of his latest moments were spent in prayer; and he maintained throughout this trying interval that propriety which belonged to the character of a man of intelligence, and that elevated dependence upon a higher power which became a christian.

Such were, as I have been enabled to sketch them, the life and death of our deceased fellow member. We see, pictured in them, the employments of a man bent earnestly and steadily upon the faithful discharge of the duties which pertained to the local situation allotted to him by his Creator. No meretricious artifice to attract the popular applause, no disingenuous manœuvring were perceptible in his character. He was rather one of those adapted, by persevering labour, to erect a new institution, than qualified to turn its existence to his own private advantage. He saw no other route to eminence open to him, in which he should escape with an unwounded conscience, than the direct effort to win success by meriting it; a method not always crowned with prosperity, but which, at least, leaves the moral sense uncontaminated with guilt. In the discharge of duties of any kind, Dr Ellis was faithful, assiduous and persevering. This was evinced as well in private practice as in his services to public institutions. His sense of conscience and that of honour, which were combined together, revolted at trick and disingenuousness. These qualities rendered him

firm and steady in his friendships. Unreproached in his professional character, he was one of the most attached and consistent members of this society. Warm and kind as a son, brother and husband, his loss will be long felt by the circle of relatives whom he has left behind him; nor will the vacuity be soon filled.

Dr Ellis was slender in his figure, though labouring under no known and well defined disease; and apparently but little calculated to endure fatigue. To this, however, he fearlessly exposed himself; and the most strongly marked character of his physiological temperament was, perhaps, a capability of unwearying and persevering industry.

His services to science and useful art may be principally comprised under the head of pharmacy. We have already mentioned his courses of lectures, and his valuable journal. Through the medium of the latter, not only have many important and useful discoveries of European experimentalists been made known to the American public, but a number of original scientific inquiries have been first presented to the learned world; inquiries which have afterwards been thought to possess such merit as to entitle them to republication by some of the most philosophic writers of Paris. In addition to this, he was the author of a Medical Formulary, which has passed through two editions, and has been analysed, with the abstraction of its contents, as one of the standard American works on that subject, by the compilers of the *Pharmacopée Universelle*.

MISCELLANY.

On the Preparation of the Iodurets of Mercury, by M. Berthelot.—Two methods have hitherto been employed to prepare the iodurets of mercury. One consists in a double decomposition of a proto- or a deuto-salt of mercury by the ioduret of potassa. The other, in the trituration of determinate proportions of iodine and mercury. It is to a slight modification of the latter that I wish to invite attention, especially in the preparation of the proto-ioduret of mercury. It may be well, however, to point out, in the first place, the inconveniences attendant on the first of these two modes.

If a deuto-salt of mercury be employed, there will be a very beautiful red precipitate (the deuto-ioduret of mercury), but if there be an excess either of the mercurial salt or the alkaline ioduret, a portion of the precipitate will be re-dissolved, and a double salt of mercury and ioduret of potassa will be formed, which will be lost in the washing. The quantity of the product may therefore be less than that of the substances employed, except the greatest care be taken. If a proto salt of mercury be employed to obtain the proto-ioduret, still greater precautions are necessary. It is essential in the first place to prepare the proto-nitrates or the proto-acetates of mercury, entirely free from the deuto salt; in the next place, the different reactions which take place on the mixture of mercurial solutions with ioduret of potassa, will sensibly alter the nature of the precipitate. In fact, when the proto-nitrate is employed, water acidulated with nitric acid must be used to dissolve it, and although a small portion of alkali be added to the solution of the ioduret to neutralize the excess of acid, yet deuto-ioduret of mercury will be formed, which is precipitated with the proto-ioduret, and communicates a more or less yellowish tinge to it; and even supposing that the mercurial liquor was perfectly neutral, great care must be taken not to add the alkaline ioduret to excess, for, if this be done, the proto-ioduret of mercury will be partly converted into metallic mercury in a very minute state of division, which will communicate a blackish green colour to the proto-ioduret; and partly into deuto-ioduret, which will form a soluble alkaline iodo hydrargyrate, which will be lost in the washing. As to the employment of the proto-acetate as recommended by M. Polydore Boullay, in his memoirs on *double iodurets*, it does appear better suited for the preparation of the proto-ioduret of mercury. The insolubility of this salt in cold water is well known, and it is moreover known that if it be heated in order to dissolve it, the deuto-acetate is formed, and this gives the same precipitates as the proto-nitrate. However, if a cold solution of the alkaline ioduret be triturated with the proto-acetate, it will be seen that it assumes a greenish black colour which gradually becomes of a beau-

tiful yellowish green colour; the true tint of the proto-ioduret of mercury; but as undissolved portions of the acetate of mercury are to be observed in this precipitate, and as in washing it with boiling water, to dissolve the proto-acetate, it will be immediately converted into the deuto-acetate, or change the nature of the precipitate, it appears to me that this method must likewise be relinquished.

Proto-ioduret of mercury by triturating iodine with mercury and alcohol.—The iodurets of mercury were at first prepared by the trituration of iodine and mercury, an operation which requires considerable time for the combination to be complete, especially as respects the proto-ioduret.

Afterwards, it appears that preference was given to the procedure of causing a double decomposition of soluble mercurial salts by an alkaline ioduret, as affording the most beautiful products, which in fact is the case as regards the deuto-ioduret of mercury. Nevertheless I prefer the use of the first plan, modified in some degree, as the easiest and most advantageous.

The proto-ioduret is composed: Hg. + I.

1 Atom Mercury,	1265,822	Mercury,	61,60
1 Atom Iodine,	789,145	Iodine,	38,40
<hr/>		<hr/>	
2054,967		100,00	

To prepare it, 38.40 of iodine and 61.60 of mercury are to be weighed out, and poured into a flat bottomed mortar and well triturated. This mixture will soon assume a reddish colour, and shortly afterwards, on the addition of a small quantity of alcohol at 33°, and as strong as possible, added drop by drop whilst triturating, it will become of a green colour with a slight tinge of yellow, and all the mercury and iodine will have disappeared. The alcohol will have almost entirely evaporated, and the result will be a very beautiful proto-ioduret. It is evident that in this operation, the deuto-ioduret of mercury is first formed, mixed with iodine and un-reduced mercury, the alcohol has a tendency to separate this deuto-ioduret, and in dissolving the iodine, brings the different parts of mixture into closer contact and soon causes a perfect combination of the two bodies.

By triturating together, 100 parts of the deuto-ioduret, and 4450 of metallic mercury, with a little alcohol, the proto-ioduret is also obtained.

Deuto-ioduret of Mercury.—The deuto-ioduret of mercury is composed: Hg. + I₂.

1 Atom Mercury,	1265,822	Mercury,	44,51
2 Atom Iodine,	1578,290	Iodine,	55,49

To prepare this ioduret 55.49 of iodine are to be mixed with 44.51 of mercury, and the same operation pursued as for the proto-ioduret, taking great care to add the alcohol only by drops, and triturating the mixture for a few moments between each addition of the liquid, because if too great a quantity of the alcohol be added at once, the reaction will be too violent and sometimes determines such a development of heat that the mixture fuses, and disengages fumes of iodine. This plan also succeeds very well, and although it has the advantage of always affording a good product, whose composition is exact, its colour is far from being as fine a red, or having the brilliance or velvety appearance of that obtained by double decomposition. But by subliming the iodurets obtained by either of these modes, the result is precisely the same.—*Journal de Pharmacie, August 1831.*

SCHOOL OF PHARMACY IN PARIS.

Opening of the Practical School.—The opening of the session took place on Thursday the 25th of May. M. Laugier, director of it, explained in his discourse the advantages which ought to result to the establishment by the extension given to each of the courses of the school. He announced, that besides the means of instruction offered by the Practical School, collections of natural history and *materia medica* would be open to the scholars on certain days.

The director then, in the following terms, pointed out the distribution of the studies, and the utility of practice in the study of chemistry.

“The school has provided, for the students who shall be admitted to the Practical School, laboratories distinct from those where the candidates work in the preparation of the subject of their theses. There the students will be daily exercised in all kinds of manipulation. During the first year, they will be occupied, under the direction of the professors, either with the simple mixture of bodies and the making up of formulas, the preparation of compound medicines, or with chemical operations, whose success requires knowledge, the necessary consequence of long practice.

In general, sufficient importance is not attached to certain easy operations and simple mixtures, which persons slightly initiated in the art consider as trifling or insignificant, and offering no interest. Nevertheless, in the hands of skilful operators, these experiments, to all appearance so simple, have frequently been the means of discoveries sufficiently important to advance even chemistry, so intimately connected in its objects with pharmacy, so that the latter may with justice claim the glory of having given rise to the former.

“In the second year, the students already familiar with a great number of bodies, and the combinations which they form with each other, and having acquired the habit of manipulating, will be prepared to undertake labours of a higher order; those, for instance, whose results are of such a nature as to throw a light upon important questions of legal medicine, to resolve which application is so often made to apothecaries, and which, without doubt, present great difficulties, especially to those who find themselves unsupported, and abandoned to their own resources.

“On occasions unhappily too frequent, when it is necessary to verify the existence of poisonous substances, the use of which may compromise the honour and even the life of individuals who are the objects of the investigation of justice, how much is it to be desired that apothecaries, naturally consulted on these delicate questions, should possess sufficient knowledge to pronounce in a positive manner, or should refrain from giving any opinion, if their experiments had not sufficiently convinced them. For, in certain circumstances, gentlemen, great knowledge is necessary to prevent us from considering as a real fact, what has only the appearance of truth. There are too many examples, in the judiciary calendar, of fatal errors, which would not have been fallen into, if there had been a more thorough knowledge of the different modifications or changes which bodies are capable of undergoing.

“During another part of the second year, experiments upon vegetable or animal analysis will be undertaken by the students.

“They will also be exercised: 1st. In becoming familiar with the characters of minerals, those which strike our senses, and those which are easily discovered by the assistance of physics and chemistry; 2d. In the analysis of minerals, for the

take of proving the different states in which they exist in nature; 3d. In comparing the processes employed to separate the elements which form these compounds, and to estimate exactly the different proportions of the principles.

"All these exercises, gentlemen, are intended to form good practitioners, who alone can become chemists and skilful apothecaries. Theory, which is so necessary a thing, is only truly valuable, in proportion as it may be applied to actual practice."—*Journ. de Pharmacie*, June 1831.

Extractum Taraxaci.—Dr Epps states in one of his lectures on *Materia Medica*, that the extract of *Taraxacum* prepared in the usual way is inert, whilst that produced by spontaneous evaporation of the juices of the plant gathered in the autumn, is a valuable and efficacious article, and deserves the praises bestowed on it by Pemberton (*Diseases of the Abdominal Viscera*). It forms a solid mass of a fine colour, and not the treacle-like soft substance usually to be found in the shops.—*Lancet*, July 1831.

Hydrocyanic Acid.—Mr Laming, of London, gives the following plan and proportions for obtaining a medicinal hydrocyanic acid of a definite strength.

Tartaric acid,	150 grains
Cyanide of potassium,	66 grains
Distilled water,	18 f. drachms.

The acid resulting will most closely approximate in strength to that of Vauquelin when due calculation is made for evaporation during the formation of the latter.

Each fluid ounce will contain exactly 12 grains of pure acid. Each fluid drachm one and a half grains, and each fluid minim one fortieth of a grain.—*Ibid*.

Purification of Silver.—M. Guibourt gives the following method for obtaining silver in a perfectly pure state, and free from copper. After dissolving the alloy in nitric acid, he permits crystallization to take place, and throws the crystals into a funnel, the spout of which is obstructed by fragments of glass; they are to be washed with concentrated nitric acid, till they lose all traces of copper; on being redissolved, and again crystallized, they will become a perfectly pure nitrate of silver. The same chemist also states that he has found that vessels made of perfectly pure silver were more readily acted on by alkaline salts, &c. than when they contained some alloy of copper; though he is unable to state what are the best proportions of the two metals.—*Journ. de Chim. Med. Sep.* 1831.

Method of Removing the Stain of Nitrate of Silver from the Skin.—M. Deleschamps was consulted by a young lady to remove black marks on her skin, produced by the application of a solution of nitrate of silver, for the purpose of staining her hair. This he effected by washing them with a concentrated solution of chloride of soda, and as soon as they assumed a whitish colour, using a solution of ammonia, made with one part of ammonia to six of water.—*Ibid*.

Protoxides of Copper, &c.—M. Wohler has found that the protoxides of copper, iron and manganese, can be readily procured by melting the chlorides of these metals with dry carbonate of soda. The heat of a spirit lamp is sufficient.—*Ibid*.

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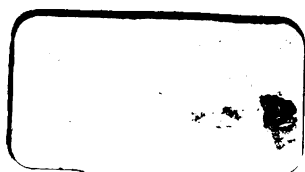
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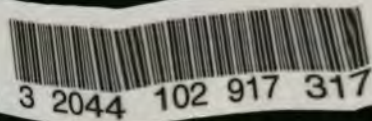
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